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The Practical Teacher

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Wisdom is humble that he knows no more.'—COWPER.

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PAPERS FOR PUPIL TEACHERS.

BY JOHN ADAMS, M.A., B.SC., F.C.P., ETC.
Principal, Free Church Training College, Aberdeen.

THE PUPIL TEACHER'S LIBRARY.

USUALLY it is a very simple affair—the Pupil Teacher's Library. It numbers some half-a-dozen volumes, and needs no grander book-case than a stout elastic band. It is carried to and from school almost every day, and is the pupil teacher's eternal disgrace, though the pupil teacher does not know that.

How is he to know that head masters, school managers, and Government inspectors, are never tired of complaining of the shameful lack of reading among pupil teachers? All who are placed under the Queen and over pupil teachers, join with cheerful unanimity in deploring the narrowness of the literary horizon of the average pupil teacher. Inspectors, indeed, are particularly fond of embellishing their reports with funny answers gathered from what may be called the general information section of pupil teachers' examination paper answers.

Now, writing to you as a friend, I am extremely sorry to have to begin by admitting the truth of what all those gentlemen say. Speaking generally, you pupil teachers are shamefully narrow in your reading. If your critics were to ask me whose fault it is that you read so little, I might have an answer that would be pleasanter for you than for your critics. Maybe if your superiors arranged your work better in school, and made wiser regulations about your own examinations, the reproach of an elastic-banded library might be removed from you.

However, my business here is not to determine who is to blame for the present state of matters, but to suggest some way of improving things under present conditions. I cannot change the existing arrangements of schools and examinations, but I can point out some ways in which you can make a better use than many of you do of your opportunities.

Your complaint is that you have no time for general reading after the hard work of the school, and the equally hard work of preparing your own studies. There is a good deal of truth in your complaint, but you will find that wise head masters do not make anything like the same demands on your memory during the first part of your school year. Then is the time to do your general reading. Besides, if you could just get out of your mind the very false idea that general reading is only one subject the more in that dread array which must be battled with once a year, you would face it in a different spirit. General reading should always be regarded as a luxury and a pleasure.

Some people talk of general reading and desultory reading as pretty much the same thing, and roundly condemn both of them. Now, if you were young folks who had nothing to do all day, and no regular studies to face, I would heartily agree in this condemnation. It is a ruinous system that allows young folks simply to follow their inclination in reading or in anything else. The mind must be strengthened by continuous and steady application, and it must be trained by having its application directed into suitable and profitable channels.

But with you the case is quite different. No one can say that you have not enough of well-regulated study. A certain amount of *the disagreeable* is necessary, according to some writers, in a true educational system; and on all hands it is conceded that you have quite a sufficient share of this essential. Reading without a definite aim is very generally condemned, but in your case the danger is all the other way. Most pupil teachers read only what will be of use in their examination. Since, then, you have plenty of well-directed, steady, and disagreeable work, you may well afford to let yourselves go a little in the matter of general reading.

This, indeed, is the essential point. Your general reading ought to be really interesting and pleasant in itself, and not undertaken merely because it is going to be useful to you in examinations, or in any other way. You will find that if you read for your own pleasure, all your reading will come in very useful at a later stage, and even at present in your

BRITISH MUSEUM

examinations. But by a strange psychological law it comes about that if you read for the sake of this ultimate good, almost all the pleasure vanishes.

You want to know what books you should read. Now, it may seem rather strange that I should write an article on the Pupil Teacher's Library, and yet, whenever you ask me what books you should read, I answer that I cannot tell. The truth is, that no one can tell exactly what another should read. We may lay down general rules, and recommend or condemn particular books; but, after all, each reader must choose his own books. Now, if I knew which books you really enjoyed reading, I could tell at once that these are the books you ought to read.

The mistake that many pupil teachers make is to imagine that they must read systematically through what are known as the 'great authors.' I have known a pupil teacher sit down doggedly to 'Milton's Complete Works,' with the determination to read them right through, and then 'go in for' Spenser in the same way. Another pupil teacher of my acquaintance did solemnly commence, and conscientiously finish, Gibbon's 'Decline and Fall.' They might as well have begun Latin by learning the dictionary.

You will never master your language and literature by this deliberate setting of yourself to do it. No doubt your studies include portions from the standard authors to be got up and thoroughly mastered. But after you have parsed and analysed the 'Deserted Village' or 'Macbeth,' you are not to imagine you have been reading English literature. Take my word for it, these books were *not* written to be parsed and analysed, as so many pupil teachers seem to think they were. They were written to be read, thought over, and, above all, *enjoyed*. Never mind what advice is given to other people: to pupil teachers the best advice that can be given in regard to general reading, is to read nothing that they do not read for its own sake and *enjoy*.

This may seem dangerous advice, and I know that some people will tell me that I am encouraging you to read nothing but sensational story-books if you are boys, and sentimental love-tales if you are girls. But I am not afraid of what such people say. For, in the first place, I am sure that no boy or girl, who works hard at study as you do, can ever be so far lost to good taste as to read mere trash; and, in the second place, if there are pupil teachers whose natural taste is so low that they can take pleasure in nothing but trash, I can only say that it is better to read the poorest penny dreadful (so long as it is not morally bad, which raises quite a different question) with distinct pleasure and appreciation, than to read Milton or Shakespeare as mere unintelligible and distasteful task work.

Your rule should be to read the highest kind of literature that you can really enjoy. Ruskin, the great critic, says somewhere, that there is a danger in presenting too good art to people as yet untrained to understand it. In other words, an inferior kind of picture is really a better thing for some people than a masterpiece. His rule in art is to present to the student of art, not the best pictures you can get, but the best pictures that the student at that stage can truly appreciate. What is true in art, is equally true in literature.

If you find that Milton is stiff and dry and hard: that Wordsworth is dull: that Browning is unintelligible, do not be discouraged. This only means that you are not yet ripe for those writers; try some others, till you find one that you really like and can follow easily—Scott or Macaulay, Longfellow or Hemans, Mark Twain or Ingoldsby. By-and-by you will get beyond those comparatively easy writers, and, without thinking any the less of them, will think all the more of the greater writers they lead you up to.

One thing which more than all others helps to keep pupil teachers from general reading, is the very bad habit, into which they cannot avoid falling, of speaking and writing of books they have not read, have not even seen. At your examinations you are often asked, who wrote so-and-so book, and when: or, what books did So-and-so write? This style of question is gradually dying out, and it is high time. It would be hard to imagine a more absurd or unscientific way of examining. It is of no earthly consequence who wrote a book, or when, if we know nothing about the book itself. If you keep your eyes open, you will notice in recent examinations the newer and better way. Quite a list of books is given, and you are asked to tell what some one of the books is about.

Suppose you apply to your own education the principles which are now universally adopted in the education of your pupils; for you must never forget that you are *pupil* teachers, and that the same principles apply to you as to your pupils. We have found the utter folly of putting words in the place of ideas or things. Things first, words afterwards, is the rule. But if we ourselves get up lists of books, and authors, and dates, and short summaries of the contents of books, we are putting mere names, mere words, in place of the real things—the books themselves. Modern education *demands* that the pupil be perfectly familiar with things at first hand, before any attempt is made at naming and classifying them. Why should literature alone be considered a suitable place for naming and classifying objects totally unknown to the pupils?

Do not be alarmed at the word 'Library.' It is not meant that you should buy a great number of books, and fill a great number of bookcases. Your real library consists of the books you have read, not of the books you possess. You may really possess few more volumes than the elastic-bound set you carry to school, and yet have a capital library in your head. Books are very cheap, no doubt, but they still cost money, and many of you cannot afford to spend much. Yet there is nothing so really accessible nowadays as books. All of you have the run of a library of some sort, and almost all of you have access to large and well-arranged Public Libraries.

Those of you who have this advantage could not do better than take out all the books mentioned in your Literature Class-book, and see what they are like. Dip into them here and there, and you will be surprised to find how many interesting bits you will come across in them, and very often you will be drawn into reading the whole book. In any case, you will see the actual book, and will be able to associate what your text-book says with *some real thing*.

How should a Pupil Teacher's Library differ from other people's? The answer is easy. It should not

differ at all. People used to think that a child should be educated almost from its cradle for the special work for which he is intended. In that way you should always be reading about education. But ideas have now quite changed, and it is regarded as most undesirable to narrow down a student in his reading to the subjects special to his future work. Your first business is to be intelligent men and women, who can talk on general subjects without betraying that you are teachers. The reproach against our profession is that we regard the great world as a school, and can never rise above the things of our own little world. I hope none of you will ever be ashamed of his profession; but unless you want the profession to be ashamed of you, you will read widely outside of its narrow demands.

COMING MEN.

VI.—MR. MARSHALL JACKMAN.

Member of the N.U.T. Executive; Member of the Executive of the M.B.T.A.; Member of the Committee of the Assistants' Federation; Chairman of the London Committee of Assistants; Honorary General Secretary of the Norwood Liberal and Radical Association; Member of the General Committee of the London Liberal and Radical Union.

Yours faithfully
Marshall Jackman

To interview Mr. Marshall Jackman is not an easy task. His professional position gives him many duties, and to these are added many more of a political nature. Our readers will be familiar with the name which appears at the head of this sketch. During recent years Mr. Jackman has earned a popularity which is well merited, and we venture to prophesy that he will be among the foremost of our 'Coming Men.' It was after a long day at Russell Square that we managed to obtain a quiet hour with him. We found him at the National Liberal Club, in Whitehall Place, S.W., of which club he is a member. We found that Mr. Jackman made his appearance in the world in the year 1860, and that his birthplace was the City of Exeter. He spent his boyhood at St. John's Hospital School, in that city. The school was not under Government inspection, and thus the 'annual parade day' was unknown to him. He entered the scholastic profession as a pupil-teacher at St. Thomas' Board School, Exeter. Mr. T. J. Macnamara was a brother P.T. with him at the time. In the year 1878 Mr. Jackman sat for Scholarship, and the result declared him thirty-eighth on the list. In 1879 he entered Borough Road Training College, and was placed in the First Division of the Certificate List each year. The editor of the *Schoolmaster* followed him to Borough Road in the following year. Leaving college, Mr. Jackman was appointed by the School Board for London to the Webber Road School, Southwark. He was last year transferred to the Holland Street Board School, Southwark, and is at present engaged there as Assistant Master.

The history of Mr. Jackman's gradual rise in his profession is interesting. As far back as 1886 he created much discussion by a paper which he gave upon the necessity for Parliamentary representation for the N.U.T. For seven years he has been an active member of the local Committee of the Southwark Association, and during that time he has been constantly before those interested in Union matters. In 1892 he was nominated by the Southwark Association for the Executive of the N.U.T., but was unsuccessful. In September of the same year he was elected to the Executive of the M.B.T.A., and last year he was elected at the top of the poll. In 1893 Mr. Jackman was again nominated for the Executive of the N.U.T., and at the Nottingham Conference of Assistant Teachers he was selected as a candidate. At the Liverpool Conference of the N.U.T. he was declared elected. The events of the past twelve months have brought Mr. Jackman very prominently before the public. In connection with the very serious question of Security of Tenure, Mr. Jackman's name naturally occurs to every teacher. His efforts in behalf of Mr. Tunnicliffe, of Wimblington fame, will not easily be forgotten. Both on the platform and in the press did Mr. Jackman plead for the freedom of the teacher. The London dailies, time after time, bore ample testimony to the energy and zeal which Mr. Jackman threw into his attempts to bring before the public a thorough exposition of the existing state of circumstances. The *Daily Chronicle* of September 7th, 1892, published a letter from the pen of Mr. Jackman upon the Wimblington case, which attracted almost universal attention. Commenting upon this contribution, the *Daily Chronicle* stated, in no unmistakeable manner, that a necessity existed for the Vice-President of

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Marshall Jackman

To interview Mr. Marshall Jackman is not an easy task. His professional position gives him many duties, and to these are added many more of a political nature. Our readers will be familiar with the name which appears at the head of this sketch. During recent years Mr. Jackman has earned a popularity which is well merited, and we venture to prophesy that he will be among the foremost of our 'Coming Men.' It was after a long day at Russell Square that we managed to obtain a quiet hour with him. We found him at the National Liberal Club, in Whitehall Place, S.W., of which club he is a member. We found that Mr. Jackman made his appearance in the world in the year 1860, and that his birthplace was the City of Exeter. He spent his boyhood at St. John's Hospital School, in that city. The school was not under Government inspection, and thus the 'annual parade day' was unknown to him. He entered the scholastic profession as a pupil-teacher at St. Thomas' Board School, Exeter. Mr. T. J. Macnamara was a brother P.T. with him at the time. In the year 1878 Mr. Jackman sat for Scholarship, and the result declared him thirty-eighth on the list. In 1879 he entered Borough Road Training College, and was placed in the First Division of the Certificate List each year. The editor of the *Schoolmaster* followed him to Borough Road in the following year. Leaving college, Mr. Jackman was appointed by the School Board for London to the Webber Road School, Southwark. He was last year transferred to the Holland Street Board School, Southwark, and is at present engaged there as Assistant Master.

The history of Mr. Jackman's gradual rise in his profession is interesting. As far back as 1886 he created much discussion by a paper which he gave upon the necessity for Parliamentary representation for the N.U.T. For seven years he has been an active member of the local Committee of the Southwark Association, and during that time he has been constantly before those interested in Union matters. In 1892 he was nominated by the Southwark Association for the Executive of the N.U.T., but was unsuccessful. In September of the same year he was elected to the Executive of the M.B.T.A., and last year he was elected at the top of the poll. In 1893 Mr. Jackman was again nominated for the Executive of the N.U.T., and at the Nottingham Conference of Assistant Teachers he was selected as a candidate. At the Liverpool Conference of the N.U.T. he was declared elected. The events of the past twelve months have brought Mr. Jackman very prominently before the public. In connection with the very serious question of Security of Tenure, Mr. Jackman's name naturally occurs to every teacher. His efforts in behalf of Mr. Tunnicliffe, of Wimblington fame, will not easily be forgotten. Both on the platform and in the press did Mr. Jackman plead for the freedom of the teacher. The London dailies, time after time, bore ample testimony to the energy and zeal which Mr. Jackman threw into his attempts to bring before the public a thorough exposition of the existing state of circumstances. The *Daily Chronicle* of September 7th, 1892, published a letter from the pen of Mr. Jackman upon the Wimblington case, which attracted almost universal attention. Commenting upon this contribution, the *Daily Chronicle* stated, in no unmistakeable manner, that a necessity existed for the Vice-President of

the Council to have 'some effective means of making the authority of reason and justice promptly felt.'

The *Morning Leader* of February 22nd, 1893, said—

'Mr. Marshall Jackman, the active Secretary of the Norwood Liberal Association, will in all probability be one of the members of the new Committee of the National Union of Teachers. Mr. Jackman will deserve this honour at the hands of his fellows. Apart from the fact that he is a successful Board School instructor, the metropolitan teachers will no doubt remember that he was the first to publicly expose the political persecution of the Wimblington schoolmaster. Mr. Jackman has, indeed, performed an admirably zealous work in connection with the Union, and on the platform and in the press has exhibited a most intelligent resolution to improve the status of the schoolmaster. His unselfish activity has already secured his election to the Executive of the M.B.T.A. Mr. Jackman's gentle manners conceal a singularly energetic disposition. He has a remorseless appetite for work, and he seeks to satisfy it in many useful channels of public activity.'

Mr. Jackman worked hard in connection with the Superannuation question to secure London teachers against the injustice of the Board's Scheme, and thus helping forward the establishment of a General Pension Scheme. On the subject of Extraneous Duties he waxes particularly eloquent, and the 'liberty of the subject' is his chief desideratum. That every individual should have perfect freedom and just right to exercise the duties of citizenship is Mr. Jackman's chief idea. He believes that the teacher should utilise his educational advantages in the arena of public politics, and conceives it to be the duty of every competent individual to bring his opinions and influence to bear upon the public questions of the day. It is not, therefore, a matter for surprise to find that Mr. Jackman's popularity, as well as his energies, are not confined to professional questions. His connection with the political world is most creditable. In the General Elections of 1885 and 1886 he took a most active part. In the former year he was a local secretary and a member of the Executive of the Norwood Liberal Association. In 1888 he was elected Organizing Secretary, and in 1890 he was made Hon. General Secretary. At the last General Election he held the position of Hon. Secretary to the Election Committee. He has also taken an active part in each of the County Council Elections in his division. In the area covered by the Lambeth Vestry Mr. Jackman's political influence is great. The increase of rates in that part of the metropolis has received his careful attention, and he has headed more than one deputation to the Vestry on this and other questions. Mr. Jackman is an expert in Registration matters. He has contributed articles to the London Press on the subject, and frequently represented his party at the Revising Barrister's Court.

He is an authority on the Land Question, and has distinguished himself in various parts of London by his able lectures on this and the Eight Hours question. The General Committee of the London Liberal and Radical Union, which is the political organizing body for the metropolis, and which consists of two members elected by each Parliamentary division, claims Mr. Jackman as a member. This fact is significant of the value set upon Mr. Jackman's public services. At the present time the eyes of all members of the N.U.T. are upon Mr. Jackman, because of the remarkable ability he is displaying upon the matter of the Union's finances. He is a most expert mathematician, and, as a Member of the Finance Committee of the N.U.T. Executive, his aid will be valuable, and the general members of the Union will hear more from him.

I ventured to sound Mr. Jackman on his idea of the future policy of the profession. Respecting the national movement of the Assistant Teachers, he said:—

'The Assistant Teachers have at length realised that they can help themselves. I supported Mr. Moore's proposal for a Federation Scheme at the Nottingham Conference, and the movement will still receive my support. I am convinced that the Federation of Assistant Teachers will not injure the Union, but will materially benefit it.'

Since the above was written Federation has become an accomplished fact, and Mr. Jackman's stand at Derby will be remembered by those who heard that memorable debate.

Continuing, he said:—

'You know that I am an advocate for Electoral Districts, and I believe that, sooner or later, the principle will be accepted by the members of the Union. My greatest desire at the present time is to see the establishment of an adequate Sustentation Fund, which shall place us in a position to prevent any teacher accepting a post at a miserable salary, and enable us to maintain those whom injustice and caprice deprive of their means of livelihood. As

assistants we must vindicate our claim to the right of administering corporal punishment. We have nothing to fear from placing our positions before the public. As teachers it is our duty to educate the people, as well as the children in our charge.'

A few moments' further conversation brought our interview to a close; and, as we said adieu, we could not help feeling that we had parted with a man who is already a credit to his profession, but whose destiny is to arrive at as high a goal of distinction as is open to those whom we fitly describe as 'Coming Men.'

OUR PUPIL TEACHERS' COURSE.

I. *Scale of Marks for Pupil Teachers' Examination.*

Reading, 45.	Grammar, 80.
Recitation, 45.	Composition, 40.
Handwriting, 40.	Geography, 80.
Spelling, 40.	History, 80.
Arithmetic, 100.	Euclid, 50.
Algebra, 50.	Mensuration, 20.
Music (Theory), 15.	Music (Practical), 25.
Teaching (Theory), 40.	Teaching (Practical), 80.
Needlework (Garments), 30.	Needlework (Examination), 60.

TABLE OF MARKS OBTAINABLE BY EACH YEAR.

Per Cent.	Boys.			Girls.	
	1st Year.	2nd Year.	3rd Year.	1st Year.	2nd and 3rd Years.
100	670	760	830	760	800
75	503	570	623	570	600
50	335	380	415	380	400
40	268	304	332	304	320
35	235	266	291	266	280

(*a*) 75 per cent., or more, qualifies for the higher grant. [See, however, (*g*).]

(*b*) 50 per cent. to 75 per cent. earns the lower grant. [See, however, (*g*).]

(*c*) 35 per cent. to 50 per cent. secures no grant. This is equivalent to a '*caution.*'

(*d*) Less than 35 per cent. causes a '*warning*' that failure to the same extent next year will prevent the recognition of the pupil teacher as part of the school staff for the current year.

(*e*) Less than 50 per cent. in any subject entails a '*caution*' for that subject. This is generally expressed by the formula, '*but John Smith must pay attention to Arithmetic.*'

(*f*) Less than 35 per cent. is followed by a '*warning*' in that subject, expressed by a star (*) attached to the name of that subject.

(*g*) No matter what the *total* percentage secured may be, if in any subject (save History, Geography, and Music) less than 40 per cent. be secured, no grant will be awarded. A study of this provision will explain many seemingly anomalous awards, and avoid much heart-burning.

(*h*) The marks for Music will be included in the total on which the percentage is calculated, whether the subject be attempted or not.

(*i*) The Composition marks are assessed on the style of *all* the literary subjects.

A similar practice prevails with regard to the handwriting.

II. This month we insert Model Answers to the last questions in English.

In connection with these should be studied the notes in our Scholarship Course of the December 1893 issue.

Underneath will be found a selection of **Typical Examination Questions** set by the Department.

i.—FIRST YEAR.

(*a*) *Analysis and Parsing.*

(α) And *out again I* curve and *flow*
To join the brimming *river*,
For men *may come*, and men may go,
But I go *on* for *ever*.

(β) *But* oars *alone can ne'er prevail*
To reach the distant coast.
The breath of heaven *must swell* the sail,
Or all the toil *is lost*.

(γ) *Long looked the anxious squires: their eye*
Could in the darkness nought descry.

(δ) *But knowledge to their eyes her ample page*
Rich with the spoils of time did ne'er unroll.

(ε) *Alas!* they had *been friends* in youth,
But *whispering* tongues *can poison* truth,
And constancy dwells in realms *above*,
And life *is thorny* and *youth* is vain.

(ζ) A *sensitive* plant in a garden *grew*:
And the young *winds fed* it with *silver dew*,
And it opened *its fan-like* leaves to the light,
And *closed* them beneath the kisses of night.

(η) Make sentences of your own, containing (1) an adverbial phrase, (2) a demonstrative adjective, (3) an infinitive of purpose, (4) a participle used as a noun.

(*b*) *Accidence, etc.*

(α) Give the plurals of *child, staff, gas, ruby, tooth, brother, sow, calf, sheep, ellipsis, penny, memorandum, hero, ox, foot, axis, genius.*

(β) Give instances of nouns used only in the singular, only the plural, having only one form for singular and plural, having two forms for plural.

(γ) Give the feminine of *earl, bachelor, monk, sultan, wizard, bridegroom, testator, widow, hero, sparrow, duke, stag.*

(δ) Give examples of (1) collective nouns, (2) nouns of multitude, (3) abstract nouns, (4) verbal nouns, (5) proper nouns used as common.

(ε) Classify adjectives.

(ζ) Give the different degrees of comparison of *good, most beautiful, rougher, upper, round, extreme.*

(η) Name the interrogative adverbs, the negative adverbs, and all the parts of speech modified by adverbs, giving examples.

(θ) How many kinds of adverbs are there? Make sentences, each containing one of each kind.

(ι) Distinguish between possessive pronouns and pronouns in the possessive case.

(κ) Pronouns admit of more inflections than nouns. Prove by examples that this is so.

(λ) Classify pronouns. Which of them can be used both substantively and adjectively?

(μ) What are relative pronouns? Illustrate their use. Compare them with interrogative pronouns.

(ν) What is meant by the passive voice? What verbs cannot be placed therein?

(ξ) When is the word *to* necessary before an infinitive, and when not?

(ο) Name five of the more important auxiliary verbs, and explain their meaning and use.

(π) Give examples of some verbs which can be used either transitively or intransitively, with illustrative sentences.

(ρ) Give the past tense and past participle of *strive, do, build, shake, hang, win, burst, sink, rise, short, raise, sing, lie, sit, set, teach, get, give.*

(σ) How are verbs inflected? Explain the terms, giving three examples in each case, infinitive and subjunctive moods.

(τ) Distinguish between the gerund and the participle of a verb.

(ω) Classify prepositions, and explain the form and office of prepositional phrases.

(φ) Give some examples of the use of the same word both as preposition and conjunction—as preposition and adverb—as conjunction and adverb.

(χ) Give examples of compound and derivative prepositions, and prepositions of place, time, causality.

(ψ) Give a table of conjunctions.

(ω) Define an interjection. How does it differ from any other part of speech? How does it resemble a verb?

(*c*) *Miscellaneous.*

(α) Explain the terms *indefinite, apposition, participial phrase, subordinate adverbial sentence, gender, absolute case, irregular verb, factitive, cognate, declension, antecedent, reciprocal, reflexive.*

(β) What is inflection? What parts of speech are inflected, and for what purposes?

(γ) What is meant by *agreement* or *concord* in English syntax? Quote any rules on this subject, and illustrate them by sentences. (A VERY COMMON QUESTION.)

(δ) Explain the different uses of the objective case.

(ε) For what purposes do we employ the nominative case?

(ζ) Criticise '*The possessive case denotes the possessor.*'

(*d*) *Affixes or Suffixes, etc.*

(α) What is the meaning of the final letter or syllable in *his, clearer, childish, thyself, rivulet, when, homeward, hence, pence?*

(β) What is the meaning and use of the final syllable in *soften, chicken, kitten, golden, oxen, shepherdess, goodness, gracious, righteous, shamefaced, manhood, kingdom?*

(γ) Take the following words to pieces, and tell the meaning of each of their parts:—*friendless, coward, truthful, songster, wretched, cleanse, duckling, forgive, shipwright, fearsome, grapple, farthing.*

(δ) Give some words that are formed in the same way as the following, and in each case say what is the meaning and use of the termination:—*width, reader, learning, lambkin, fourfold, reckon, hark.*

(ε) What is the exact meaning of the termination of *strongest, homestead, northern, friendly, mankind, hillock, kindred, bishopric, landscape?*

(ζ) Form nouns from *free, brave, absolute, pretty, loyal, legal, smite, dig, hold.*

(η) Form verbs from *pure, crystal, fast, clean, assassin, hand, hot, hang.*

(θ) Form adjectives from *love, palace, burden, tribe, marry, count.*

ii.—SECOND YEAR.

(Questions given previously under 'First Year' will not be repeated).

(*a*) *Analysis and Parsing.*

(α) If a man *be* gracious and courteous to strangers, *it* shows *that* he is a *citizen* of the world, and that his heart is *no island cut* off from other lands, but a continent that joins to them; if he be compassionate towards the affliction of others, it shows that his heart is *like* the noble *tree that* is wounded *itself when* it gives the balm.

(β) Shakespeare is above all writers the *poet* of Nature, the poet *that* holds *up* to his readers a faithful *mirror* of manners and of life. *His* persons act and *speak* by the influence of *those* general passions and principles by *which* all minds *are agitated*, and the whole system of life is continued in motion. In the writings of *other* poets, a character is *too* often an individual; in those of Shakespeare *it* is commonly a species.

(γ) The *notice which* you have *been pleased* to take of my labours, *had it been* early *had been* kind; *but* it has been delayed, *till* I *am indifferent*, and cannot enjoy it; till I am solitary, and *cannot impart it;* till I am *known*, and do not want it.

(δ) The *service done*, the mourners stood *apart;* he called to mind how he had seen her *sitting* on that *very* spot, and how her book had *fallen* on her lap *as* she was *gazing* with a pensive face upon the sky. *Another* told how he *had wondered that one so delicate as she* should be so bold.

(ε) *Friends* we *still* might *seem* to be,
If my wrong *could* e'er forget.
Our hands have met *but not* our *hearts;*
I *would* our hands had never *met.*

(ζ) *There* have been *men both* abler and greater
Than William Pitt, though *it* is not *easy to cite* them;
But in all history *there* is *no* more patriotic spirit,
None more intrepid, and none more *pure.*

(*b*) *Paraphrasing.*

(α) How beautiful is night!
A dewy freshness fills the silent air;
No mist obscures, nor cloud, nor speck, nor stain,
Breaks the serene of heaven:
In full-orbed glory yonder moon divine
Rolls through the dark blue depths:
Beneath her steady ray
The desert circle spreads
Like the round ocean, girdled with the sky.

(β) Breathes there the man with soul so dead,
Who never to himself hath said,
This is my own, my native land!
Whose heart has ne'er within him burned
As home his footsteps he has turned
From wandering on a foreign strand?
If such there breathe, go mark him well,
For him no minstrel raptures swell.

(γ) I am monarch of all I survey,
My right there is none to dispute;
From the centre all round to the sea,
I am lord of the fowl and the brute.
O solitude! where are the charms
That sages have seen in thy face?
Better dwell in the midst of alarms,
Than reign in this horrible place.

(δ) By torch and trumpet fast arrayed,
Each horseman drew his battle blade,
And furious every charger neighed
To join the dreadful revelry.
Then shook the hills with thunder riven;
Then rushed the steed to battle driven;
And louder than the bolts of heaven
Far flashed the red artillery.

(ε) How many thousands of my poorest subjects
Are at this hour asleep! O gentle sleep,
Nature's soft nurse, how have I frighted thee,
That thou no more wilt weigh my eyelids down,
And steep my senses in forgetfulness?
Why rather, sleep, liest thou in smoky cribs,
Upon uneasy pallets stretching thee,
And hushed with buzzing night-flies to thy slumber,
Than in the perfumed chambers of the great,
Under the canopies of costly state,
And lulled with sounds of sweetest melody?

(ζ) No war or battle sound
Was heard the world around;
The idle spear and shield were high up hung;
The hookèd chariot stood
Unstained with hostile blood;
The trumpet spake not to the armèd throng;
And kings sat still with awful eye,
As if they surely knew their Sovereign Lord was by.

(*To be continued.*)

MODEL ANSWERS.

ENGLISH.

FIRST YEAR.—BOYS AND GIRLS.

1. Point out the several sentences in the following extract, and the principal parts of each :—

Alas! they had *been friends* in youth,
But *whispering* tongues *can poison* truth ;
And constancy dwells in realms *above*,
And life is *thorny*, and youth is vain.

Sentence.	Kind of Sentence.	Conn.	Subject.		Predicate.		Object.	
			Simple.	Enlarge.	Simple.	Extens.	Simple.	Enlarge.
A. Alas! they . . . . youth	PRIN. SENT.		they	(alas)	had been · friends	in youth (time)		
B. But . . . truth	PRIN. SENT. Co-ord. and Adv. with *A.*	but	tongues	whispering	can		(to) poison truth	
C. And . . . above	PRIN. SENT. Co-ord. with *B.*	and	constancy		dwells	in realms above (place)		
D. And . . thorny	PRIN. SENT. Co-ord. with *B* and *C.*	and	life		is thorny			
E. And . . . vain	PRIN. SENT. Co-ord. with *B*, *C*, and *D.*	and	youth		is vain			

2. Parse the words in the above extract which are printed in italics.

Alas — An interjection denoting emotion. The interjection most resembles a verb, and has been called 'a *condensed sentence.*'

been — Past part. of the verb 'to be,' forming, with 'had,' the pluperfect tense; it is a copulative verb.

friends — Com. noun, 3rd plural, com., nom. case after 'had been.'

whispering — Pres. part. of verb 'to whisper,' used as adj., qual. 'tongues' attributively.

can — Verb, defect. indef. irreg. trans. act., indic., pres., plu., 3rd, agrs. with subj. 'tongues,' and gov. '(to) poison.'

(to) poison — Verb, prolative reg. trans. act. infin., gov. by 'can' and govng. 'truth.'

above — Adv. used as adj., qual. 'realms' attributively.

is — Verb, cop. irreg. intrans., indic., pres., sing., 3rd, agrs. with its subj. 'life.'

thorny — Adj. of quality, pos., qual. 'life' predicatively.

3. Give some examples of the use of suffixes, or terminations, showing how—

(*a*) Nouns may be formed from verbs ;
(*b*) Verbs may be formed from adjectives ;
(*c*) Adjectives may be formed from nouns.

The suffix *er* is commonly used to form *nouns* from *verbs*. It denotes agent.

(*a*) A *swimmer* is one who *swims*.
A *singer* is one who *sings*.
A *speaker* is one who *speaks*, &c.

The suffixes *art*, *or*, *ent*, *ant*, *ar*, *ard*, are similarly used—(*e.g.*) braggart, actor, student, assistant, liar, drunkard ; *age*, *ary*, *lock*, denote an *abstract* quality—(*e.g.*) tillage, commentary, wedlock.

(*b*) The following are used to form *verbs* from *adj.*: *EN* (to make)—weaken, brighten, sweeten, &c. *FY* (to make)—purify. *ISE* (to make)—brutalise, civilize. *ER* (frequentative, but causative after adj.)—linger (from long), lower. *SE* (to make)—cleanse, rinse (*Ger. rein*, pure).

(*c*) Suffixes used to form *adj.* from *nouns*: *FUL*, *ATE*, *SOME*, *Y* = *full of*—(*e.g.*) fruitful, affectionate, troublesome, watery.

AC, *AL*, *AR*, *AL* (belonging to), as—demoniac, maternal, globular, arithmetical.

LIKE, *LY* (resemblance), as—lifelike, homely.

EN (made of)—golden; *ERN* (direction)—northern, &c.

4. What are interrogative and relative pronouns? Give examples of both, and also examples showing how the same word may serve both purposes. Name some interrogative adverbs.

Old definition. *Interrogative pronouns* are used in asking questions.

There is no need to distinguish interrogative and relative pronouns as separate classes. For, taking the question '*who* did it?' and the answer 'I am he,' we find the full sentence is 'I am he who did it'; where the antecedent is composed of the answer. Thus we see the meaning of the following definition : 'An interrogative pronoun is a relative in search of an antecedent' (Phil. Mus.).

Interrogatives are underlined in following examples :—

Who was there? Which is it?

Relative pronouns, besides standing for nouns—

(1) Refer to noun already stated = antecedent;
(2) Join sentences.

(*e.g.*) 'The sun is bright, which shines on the earth.' If there were no relatives we should say 'and it.'

Same word used as—

Interrogative : *Who* did it? *Which* did he require?
Relative : The man, *who* was ill, is dead ; I have the things *which* I asked for.

Interrogative adverbs are *WHEN*, *WHENCE*, *WHITHER*, *WHERE*, *HOW*, *WHY*, formed from who.

5. Verbs in the infinitive sometimes have the word 'to' before them, and are sometimes without it. Explain this, and say when the word 'to' is necessary and when it is not used.

(*a*) The infinitive *without* 'to' is used (1) after the auxiliary verbs do, may, can, shall, will; and also after bid, dare, let, make, must, &c. ; *e.g.* I do not *like* this. Bid him *learn* his lesson, &c.

(2) After many verbs denoting perception, (as) hear, feel, see, view, behold, &c. ; *e.g.*, I did not hear you *call*. He felt a hand *touch* him.

(3) After had better, had rather, and than; *e.g.*, We had better *begin* again. Sooner than *submit* I am ready to die.

(*b*) The infinitive *with* 'to' is commonly used as the *subj.* or *obj.* of a verb, as—

To *hesitate* is to be lost.
I like *to rise* early.

Etymologically the two forms are distinct, the one *without* 'to' in Anglo-Saxon ending in *an*—

Writ-an = to write.

The one *with* 'to' ended in *anne*, and was the dative of the infinitive declined—

Writ-anne = to write.

6. What is meant by agreement or concord in English syntax? Quote any rules on this subject, and illustrate them by sentences.

By concord or agreement, we mean the inflections that are common to different parts of speech following from their relationship.

CONCORD OF VERB.

The verb agrees with its subj. in number and pers., as—

I *write*—write is 1st pers. sing.
You *write*—write is 2nd pers. plu.
He *writes*—writes is 3rd pers. sing.

When there is more than one subj. the verb must be plural, as—The captain and the mate *were* there.

Two or more sing. subj. connected by *OR* or *NOR* require a singular verb, as—Either the captain *or* the mate *was* there, &c.

CONCORD OF PRONOUNS.

Pronouns agree in gen., number, and pers. with the nouns for which they stand, as—

The man *whom* you see was there: whom is sing., 3rd, masc.

It is I *who* am in fault: who is sing., 1st, com.

ENGLISH GRAMMAR AND COMPOSTION.

BOYS AND GIRLS.—SECOND YEAR.

(*Answer Questions* 1 *and* 2 *and two others.*)

1. Analyse the following sentences, pointing out the principal parts of each, and the way in which the several sentences are related to each other.

Parse also the words printed in italics.

'The *notice which* you have *been pleased* to take of my labours, *had it been* early, *had been* kind; *but* it has been delayed, *till* I *am indifferent*, and cannot enjoy it; till I am solitary, and *cannot impart it*; till I am *known*, and do not want it.'—*Dr. Johnson.*

Sentence.	Kind of Sen.	Conn.	Subject.		Predicate.		Object.	
			Simple.	Enlarge.	Simple.	Extens.	Simple.	Enlarge.
A. The notice . . . . . kind	Prin. Sent.		notice	The which, &c.	had been kind			
B. which . . . . . labours	Sub. Adj. Sent. to *A*, qual. notice.		you		have been pleased		to take which	of my labours
C. had . . early	Adv. Sent. of Condition to *A*, mod. had been.	[if]	it		had been early			
D. it . . delayed	Prin. Sent. Co-ord. and Adv. with *A*.	but	it		has been delayed	till . . . . . it		
E. till . indifferent	Sub. Adv. of time to *D*, mod. has been delayed.	till	I		am indifferent			
F. and. . . it	Sub. Adv. Sent. Co-ord. with *E*.	and	[I]		can	not	(to) enjoy it	
G. till . solitary	Sub. Adv. of time to *D*, mod. has been delayed.	till	I		am solitary			
H. and . . it	Sub. Adv. Sent. Co-ord. with *G*.	and	[I]		can	not	(to) impart it	
I. till . . known	Sub. Adv. of time to *D*, mod. had been delayed.	till	I		am known			
J. and . . . . it	Adv. Sent. Co-ord. with *I*.	and	[I]		do	not	(to) want it	

Notice	Com. noun, sing., 3rd, neu., nom. case, subj. to '*had been.*'
which	Rel. pro. (antecedent=notice), sing., 3rd, neu., obj. case, gov. by '*to take.*'
been	Past part. of verb '*to be*,' aux. of passive voice.
pleased	Past part. of verb to please, reg. trans., pass., infin. past.
it	Pers. pro., sing., 3rd, neu., nom., subj. to '*had been.*'
had } been }	Verb, irreg. intrans., indic., pluperf., sing., 3rd, agrees with subj. '*it.*'
had	Past tense of verb 'to have,' aux. of perfect tense.
been	Past part. of verb 'to be,' aux. of pass. voice.
had } been }	Verb, irreg. intrans., indic., pluperf., sing., 3rd, agrs. with subj. *notice.*
but	Co-ord. and adv., conj., joins '*The notice . . kind*' to '*it . . . it.*'
till	Conjunctive adv. of time, mod. '*has been delayed.*'
I	Per. pro., sing. 1st, com., nom., subj. to '*am.*'
indifferent	Adj. of quality, pos., qual. '*I*' predicatively.
am	Verb, irreg. intrans., indic., pres., sing., 1st., agrs. with subj. '*I.*'
can	Verb, def., irreg. trans., act., indic., pres., sing., 1st, agrs. with subj. [I.]
not	Adv. of neg., mod. '*can.*'
[to] impart	Verb, reg. trans., act., infin., gov. by *can*, and gov. *it* in obj. case.
it	Pers. pro., sing., 3rd., neu., obj., gov. by '*impart.*'
known	Past. part. of verb 'to know,' irreg. trans., pass., infin., past.

2. Paraphrase the following passage :—

How beautiful is night !
A dewy freshness fills the silent air ;
No mist obscures, nor cloud, nor speck, nor stain
Breaks the serene of heaven :
In full-orbed glory, yonder moon divine
Rolls through the dark blue depths :
Beneath her steady ray
The desert circle spreads
Like the round ocean, girded with the sky.
How beautiful is night !—*Southey.*

Night is most charming, for one seems invigorated by the soft stillness of the dewy atmosphere ;

All is perfectly clear ; there is no mist, not a cloud, nor even the slightest trace or tint of anything to conceal or disturb the peaceful appearance of the sky.

There we can see the heavenly moon in all her splendour, gently revolving through endless space ; and by means of her calm and constant light, we can observe that, like the sea, the plain appears to be circular in form, being bounded and enclosed on all sides by the heavens.

We can scarcely imagine how lovely such a night as this is.

3. What are demonstrative, distributive, and compound relative pronouns respectively ? And why are they so called ? Give examples.

Demonstrative Pronouns point out with more or less precision the things to which they refer.

Root *monstro* (L.) I point out.

The Dem. Pro. are :—This, that (sing.) ; these, those (plu.); such, same, self, yon.

Sent. :—'Virtue and vice have different results ; *this* (the latter) leads to misery, that (the former) to happiness.'

Distributive Pronouns not only represent nouns, but denote all the individuals of a class viewed apart from one another.

(L.) *dis* = asunder ; *tribuo* = I give or divide.

The Distrib. Pro. are :—Each, every, either, neither.

Sent. :—'To *each* his sufferings—all are men.' (*Gray.*)

Compound-Relative Pronouns are formed from the Simple Relatives by the addition of the particles *ever* and *so*.

(L.) *Com* = together ; *pono* = I set = (composed of parts).

The Compound Relatives are :—Whoever, whosoever, whoso, whatever, &c.

Sent. :—The man, whoever he may be, who did this, will be punished.

4. Explain the exact force and meaning of the syllables printed in italics in the following words :—*Pre*-eminent, *Preter*natural, Act*ion*, *Vice*-President, Effici*ent*, Respons*ive*, Visi*ble*, *Retro*spect, *Pen*ultimate, Leg*al*.

Word.	Italicised Particle and Meaning.	Meaning of Word.
PRE-EMINENT	PRE- = before or above (L. Prefix)	Distinguished above the rest
PRETER-NATURAL	PRETER- = beyond (L. Prefix)	Contrary to nature
ACT*ION*	-ION = state (L. Affix)	State of acting
VICE-PRESIDENT	VICE = instead of (L. Prefix)	One who acts as President
EFFIC*IENT*	-ENT = state (L. Affix)	State of being able to do anything
RESPONS*IVE*	-IVE = (L. *-ivus*) make ; able	Making answer
VIS*IBLE*	-IBLE = ability (L. Affix)	That may be seen
*RETRO*SPECT	RETRO- = backward (L. Prefix)	A looking-back on things past
*PEN*ULTIMATE	PEN- = almost (L. Prefix)	Almost at the end
LEG*AL*	-AL = pertaining to (L. Affix)	Pertaining to law

5. In the case of each of the following words, make two sentences, in one of which it shall be used as a Preposition, and in another as a Conjunction :—For, Notwithstanding, Until, Except, Since.

(i.) *For.*—He did it *for* my sake. (Prep.)
'He lived, *for* life may long be borne.' (Conj.) ?

(ii.) *Notwithstanding.*—
Notwithstanding his conduct he was liberated. (Prep.)
He will do it notwithstanding that I warned him. (Conj.) ?

(iii.) *Until.*—He waited *until* his turn. (Prep.)
He stayed *until* his time had expired. (Conj.)

(iv.) *Except.*—All *except* the last. (Prep.)
Ye shall perish *except* ye repent. (Conj.) ?

(v.) *Since.*—
Since you will not obey, I shall punish you. (Conj.)?
I have not seen you *since* the day you left. (Prep.)

It is doubtful whether 1, 2, 4, 5 are ever Conj.

Note that '*that*' was formerly inserted after them—Since that you, &c. They may be described as Prep., governing sentences.

6. Explain and illustrate as you would to a class the difference between :—

Co-ordinate and Subordinate.
Active and Passive.
A phrase and a sentence.
Literal and figurative language.

Co-ordinate = equal rank or order.
Sub-ordinate = inferior rank or order.

Co-ordinate Conjunctions are those which join words, clauses, or sentences which are independent one of another.

Subordinate Conjunctions are those which join clauses and sentences of which one is in a relation of *dependence* upon the other.

Construct with aid of a Co-ordinate Conjunction a pair of sentences, as :—

(*a*) The wind has ceased *and* the rain is falling ; and by aid of a Subordinate Conjunction—

(*b*) I will come *if* I can get leave.

In (*a*) we can leave out '*and*' and still the meaning would be unchanged. The sentences are of equal importance and therefore Co-ordinate.

But with '*if*' it is different, as this word expresses a condition, and makes the second sentence limit the meaning of the first.

A sentence like this, therefore, which makes no independent assertion, is Subordinate (inferior order).

When the Grammatical Subj. is the *doer* the Verb is in the *Active* Voice.

When the Subj. is the *sufferer* the Verb is in the *Passive* Voice.

Active = doing ; Passive = suffering.

(*a*) *Active.*—The man *kicked* the horse.

(*b*) *Passive.*—The horse *was kicked* by the man.

In (*a*) the Subj. '*man*' *does* the kicking, therefore the verb kicked is in Active Voice.

In (*b*) the Subj. '*horse*' *suffers* by being kicked, therefore verb *was kicked* is in Passive Voice.

A *sentence* is a group of words expressing a complete thought, and must have two essential parts; a *subj.*, the thing about which something is said, and the *Pred.* (a finite verb) which states what we think about the Subj. as:—

Subj.	*Pred.*
He	fights.

But a *Phrase* is a group of words conveying some signification the sense of which is not complete, as:—

'To hunt the hare.'

'Having stolen the fox,' &c.

These groups of words require a finite verb to make them into sentences, as:—

To hunt the hare *is* pleasant, &c.

Language is *literal* when it *exactly* describes something, as:—'That statesman was long a support to the throne.'

But if, to give a stronger meaning to the mind, we employ an uncommon form of expression, contrasting it by illustrating it with something else, we call it *figurative* language, as:—That statesman was long a *pillar* of the throne.

Here, to make the meaning more forcible, we use a *pillar* as an illustration of the statesman supporting the power of the throne.

THIRD YEAR.—BOYS AND GIRLS.

1. Paraphrase the following extract from Coleridge's 'Hymn to Mont Blanc,' and explain separately the meaning of the words printed in italic:—

Thou first and chief, sole sovereign of the vale!
Oh, struggling with the darkness all the night,
And visited all night by troops of stars,
Or when they climb the sky, or when they sink:
Companion of the morning star at *dawn*,
Thyself earth's rosy star, and of the dawn
Co-herald, wake, oh, wake and utter praise!
Who sank *thy sunless pillars* deep in earth?
Who filled thy countenance with rosy light?
Who made thee parent of *perpetual* streams?

Thou art the only monarch of the valley, and being so lofty and magnificent, appearest during night-time to wrestle with the darkness, and to be quite close to the stars, no matter in what quarter of the heavens they may appear to be; also when day breaks thou seemest to be in close proximity to the morning star, and the ruddy glow of dawn is so reflected on thy elevated brow, that thou hast the semblance of an earthly star, and like the dawn dost warn us of the approach of day. Rouse, oh, rouse thyself, and offer up thanksgiving to that Supreme Power that made thee so bold and firm, caused thee to be such a welcome sight, and made streams to flow from thy sides continually.

Word.	Meaning.
DAWN	The break of day; the first appearance of light in the morning.
CO-HERALD	Companion of another herald. A herald is a forerunner, a harbinger, something that warns of the approach of anything.
THY SUNLESS PILLARS	Here the poet supposes the mountain to have a foundation; therefore *the sunless pillars* mean that part underground which supports (like pillars) the mountain.
PERPETUAL	Never ceasing; continuing without intermission.

2. Select from the foregoing passage any epithets which are not employed in a literal, but in a figurative or poetical sense; and say how you would explain their appropriateness to a class of older scholars.

The whole piece is a series of metaphors in which a mountain is represented as *struggling* with darkness and *being visited* by stars—stars *climbing* and *sinking* in the heavens—a mountain being a star's *companion*—the mountain itself is called a *star*—it is also made to *awake* and *utter praise*—it has *sunless pillars*—its *countenance* has a rosy light—it is also a *parent* of streams.

A metaphorical expression is one in which the name of one thing, action, or condition is put for the name of another thing, &c., on account of some *real* or *fancied resemblance* between them.

The above metaphors are used to embellish the style of the piece, to bring the sense more vividly to the mind; they give ample scope for variety of description; they are judiciously used, not being too gay or too elevated; they raise *pleasant* contrasts; and the resemblance is *easy* of comprehension.

3. Analyse the following passage, and parse the words printed in italic: 'By labour and intent study, *which* I take *to be* my portion in this life, joined with the strong *propense* of nature, I might perhaps *leave something* so written to aftertimes *as* they should not willingly *let die*.'

Sentence.	Kind of Sentence.	Conn.	Subject.		Predicate.		Object.	
			Simp.	Enlarge.	Simp.	Extens.	Simp.	Enlarg.
A. By . . . die	Prin. Sent.		I		might	perhaps By . . . . nature	[to] leave something	so . . . . die
B. which . . life	Sub. Adj. Sent. to A. qual. '*labour*' and '*study*.'		I		take		(1) which . (2) to . portion	in this life
C. as . . . . . die	Sub. Adj. Sent. to A. qual. '*something*.'		they		should	not willingly	[to] let (1) [to] die (2) as	

Which	Rel. pro. (antecedents '*labour*' and '*study*'), plu., 3rd, neu., obj., gov. by '*take*.'
to be	Verb., cop., irreg., intrans., infin., gov. by '*take*.'
propense	Com. noun, sing., 3rd., neu., obj., gov. by prep. '*with*.'
[to] leave	Verb, irreg., trans., act., infin., gov. by '*might*,' and gov. '*something*' in the obj. case.
something	Com. noun, sing., 3rd, neu., obj., gov. by '*leave*.'
as	Quasi-rel. pro. (antecedent '*something*'), sing., 3rd, neu., obj., gov. by '[*to*] *let*.'
[to] let	Verb., irreg., trans., act., infin., gov. by '*should*,' and gov. '*as*' and '[*to*] *die*.'
[to] die	Verb., reg., intrans., infin., gov. by '[*to*] *let*.'

4. Trace to their origin eight of the following words, give their exact meanings and employ each of them in a sentence of your own :—Methinks, Thoroughfare, Edification, Precipitous, Sinecure, Dormitory, Audible, Humorous, Locomotive, Centrifugal, Commodity, Nutriment.

Word.	Origin.	Meaning.	Sentence.
SINECURE	(L.) Prefix sine = without cura = case, office	An office with little or no work attached to it	The office 'Master of the Buckhounds' is a sinecure.
DORMITORY	(L.) Dormio = I sleep -tory = of or belonging to	a sleeping room.	The dormitories have been heated.
AUDIBLE	(L) audio = I hear -ible = ability	anything that may be heard	His voice was scarcely audible.
CENTRIFUGAL	(L.) centrum = centre fugio = I flee	tendency to fly off from the centre.	The earth has a centrifugal force.
HUMOROUS	(L.) humor = fluid moisture -ous = full of	descriptive of anything that excites laughter.	His plays are very humorous.

N.B.—There were supposed to be four moistures or humours in the body, on the due proportion and combination of which the disposition of body and mind depends.

LOCOMOTIVE	(L.) locus = place motum = to move	A thing that moves from place to place, a steam engine.	Locomotives travel at a very great speed.
COMMODITY	(L.) commodus = suitable -ity = state	anything that is useful, goods, wares.	Wool is the staple commodity.
NUTRIMENT	(L.) nutrio = I nurse or nourish nutrimentum = nourishment	food ; that which nourishes.	All the nutriment is extracted.

5. By what tokens can you often recognise at once that a word is (*a*) of purely English, (*b*) of Latin, or (*c*) of Greek origin ?

The purely English words denote mainly (besides natural objects) such objects and occupations as belong to a primitive state of civilization.

They include :—Names of kindred ; home ; domestic life ; simpler natural feelings of body and mind ; seasons ; heavenly bodies, &c. ; as :—father—hearth—drink—glad—fire—spring—day—sun, &c.

Grammatical characteristics are :—Demonstrative adj., as :—the, this ; the pronouns ; numerals ; auxiliary and defective verbs ; most prepositions ; conjunctions ; irreg. adj. ; most monosyllabic words ; words with distinctive English prefixes or suffixes.

Words of Latin origin are those which have Latin prefixes and suffixes and roots. *Legal* terms, as :—

Advocate, attorney, felony.

Words relating to *war*, *feudalism*, and the *chase*, as :—

Armour, chivalry, lance, scutage, quarry.

Some *ecclesiastical* terms as :—

Chapter, cloister, disciple, &c.

Names of foreign animals, trees, plants, &c., as :—

Beet, box, cedar, elephant, &c.

If words have Greek prefixes, suffixes, and roots, they are generally of Greek origin, as :—

An-archy, asteri*sk*, *phon*etic.

A considerable number of Greek words are terms connected with arts, sciences, and literature, as :—

Music, geography, and poetry.

Some words are derived from more than one language, and are called *hybrids*.

(*e.g.*) martyrdom :—martyr (Gr.), dom (Sax.).

6. Give examples of participial phrases and of adverbial sentences, and point out with examples the principal varieties of the latter.

Examples of *Participial Phrases* are in italics :—

The man *humming a tune* began to work.
The girl *having finished her lesson* went home.
Singing a song is nice.

Adverbial clauses may be arranged in the following classes :—

Time, as :—Every one listens *when he speaks*.
Place, as :—*Whither I go* ye cannot come.
Manner, as :—It turned out *as I expected*.
Degree, as :—He is not as tall as I thought *he was* [*tall*].
Cause, as :—I love him *because he is good*, *&c.*

Adverbial clauses may modify the meaning of a verb, an adj., or adv., as :—

My father died *when I was born*.
I am as cold *as ice* [*is*].
He behaved as well *as he could*.

First Year.

1. How would you illustrate by a diagram, that $\frac{3}{5} = \frac{9}{15}$ and that $\frac{1}{6} + \frac{5}{9} = 1\frac{1}{18}$?

2. (*Boys.*) By how much is the sum of 2·056 and ·92 greater than their product ? Ans. 1·08448.

(*Girls.*) Find (*by practice*) how much one man will gain upon another in 5 miles 260 yards, if he gains 22 yards in each quarter of a mile. Ans. 453 yards.

3. (*Boys.*) How many ounces of gold at £3·89375 per oz. are contained in a lump worth £113·6975 ? Ans. 29½ ounces.

(*Girls.*) Divide 79,875 by 63 by short division. Give a reason for your method of determining the remainder.

Ans. 1267, remainder 54.

4. Write in Large-hand the words—

Uvula, Vesicle, Wyvern, Xerasia, Yttria, Zigzag.

Write in Small-hand—

'Fiend, Ghost, and Sprite that haunt the night,
The Hags and Goblins do us know.'

5. Analyse the following lines and parse the italicised words :—

'Morn in the white *wake of* the morning star
Came furrowing all the orient into gold.
We rose, and *each* by *other drest* with care,
Descended to the court.'

6. (*a*) Describe the different functions of the relative pronoun. (*b*) When would you use *who*, *which*, *that*, and *as* ?

7. Write out the account of 'King Alfred and the cakes.'

8. Draw a political map of England south of the Thames.

9. Give some account of the physical features of Ireland.

10. Enumerate the provinces of Australia, giving the capitals, area, productions, and population.

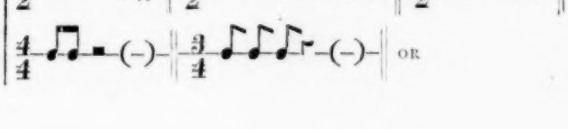
11. Give the dates of the establishment of the various Saxon kingdoms.

12. What do you understand by—*hundred*, *tithing*, *frankpledge*, *sheriff* ?

13. '*The period of the Danish invasions divides itself into three parts, during each of which a different object was aimed at.*' Fully explain this statement.

14. Give rules for the position of the hand, pen, body, and book in writing.

15. Complete each of the following bars by adding *one* note at the end :—



PUPIL TEACHERS' ROUTINE FOR FEBRUARY, 1894.

DAYS	YEARS	FIRST WEEK			SECOND WEEK			THIRD WEEK			FOURTH WEEK		
		First Lesson	Second Lesson	Third Lesson	First Lesson	Second Lesson	Third Lesson	First Lesson	Second Lesson	Third Lesson	First Lesson	Second Lesson	Third Lesson
Monday	1	Analysis and Parsing *or* Latin	How to teach Reading	Div. of Decimals Simple Practice	Analysis *or* Paraphrasing from Routine	How to teach Writing	Map of Chief British Rivers	Analysis and Parsing	How to teach Arithmetic	Physicial Geog. of Mountains and Rivers	Composition or Paraphrasing	Lives of Great Men	Geography of England
	2			Stocks. Reduc. of Vulgar Fractions			Map of Spanish Peninsula			Latitude and Longitude			Climates of British Empire
	3		How to give an Object Lesson	Mens. of Parallelograms. Theory of required rules		Notes of an Arithmetic Lesson	Map of Mediterranean Sea		Notes of a Lesson on Form	Winds and Ocean Currents			Geography of Africa
Tuesday	1	Euclid I. 9. Knitting Sock	Literature, Repetition, and Writing	Scripture *or* Revision	Euclid I. 10, 11. Paper Patterns of Garments	Composition *or* Paraphrasing	Scripture *or* Revision	Euclid I. 12. Practise Stitches	Instrumental Music *or* Literature	Prefixes, Roots, or Affixes	Euclid I. 13. Practise Stitches	Euclid Deductions *or* History	Mensuration *or* Geography
	2	Euclid I. 15, 16. Any Needlework			Euclid I. 17, 19. Flannel Patch			Euclid I. 23, 26. Practise Stitches			Euclid Revision. Practise Stitches		
	3	Euclid I. 46, 47. Cross-cut Darn			Euclid I. 47, 48. Any Needlework			Euclid Deductions Any Needlework			Euclid Deductions. Any Needlework		
Wednesday	1	Dates from 1035 to 1066 A.D.	Div. of Algebra. Practise Stitches	Science	History from Canute to the Confessor	Literature, Repetition, and Writing	Science	History from 1042 to 1066 A.D.	Multiplication of Algebra. Knitting Sock	Science	Anglo-Saxon Literature and Remains	Divison of Algebra Any Geography	Science
	2	History from 1461 to 1473 A.D.	G.C.M. of Algebra. Practise Stitches		Dates from 1422 to 1478 A.D.			History from 1478 to 1485 A.D.	Revise Euclid. Knitting Stocking		Revise Literature from 1066 to 1485 A.D.	Divison of Algebra Any Geography	
	3	History from 1649 to 1688 A.D.	Problems in Algebra. Any Needlework		Lives of Great Men			Literature from Elizabeth to James II.	Revise Euclid. Cross-cut Darns		Revise Dates	Any Mensuration. Any Needlework	
Thursday	1	Geography of Ireland	Div. of Algebra. Stocking-hole mending	Drawing	Geography of Ireland	Proofs of Algebraical operations *or* Domestic Economy	Drawing	Geography of Ireland	Circult. Decimals. Problems in Vulgar Fractions	Drawing	Geography of British North America	Mensuration *or* Domestic Economy	Drawing
	2	Geography of India	Euclid I. 20, 23. Print Patch		Productions of British Empire			Geography of India	Any Vulgar Fractions. Miscellaneous Problems		Geography of India		
	3	Geography of Asia	Revision of Euclid. Hedge-tear Darns		Geography of Asia			Geography of Africa	Miscellaneous Problems		Geography of Asia		
Friday	1	Div. of Decimals Easy Multip. of Vulgar Fractions	Practical Music	Drawing	Decimals of Money. Simple Proportions	Mensuration *or* Sewing	Drawing	Dec. of Weights & Measures. Probs. in Vulgar Fractions	Euclid Deductions *or* Arithmetic	Drawing	Any Decimal Fractions. Msc. Problems	Map of Irish Sea	Drawing
	2	Stocks. Money Decimals			Com. Proportion. Reduc. of Decimal Fractions			Com. Proportion. Vulgar Fractions of Weights			Miscellaneous Problems.	Map of Italy	
	3	Mens. of Parallelograms. Proofs of the required rules			Miscellaneous Problems			Miscellaneous Problems			Geography of Australia	Map of South Africa	
Saturday	1	French *or* Latin	Science	Euclid Deductions *or* Sewing	English from Text Book	French *or* Latin	Science	Euclid Deductions *or* Domestic Economy	Lives of Great Historical Persons	French *or* Latin	Science	Examination (See appended Questions)	
	2												
	3										French *or* Latin	Science	Examination (See appended Questions)

Re-write the following in two-pulse measure, halving the value of every note and rest :—

| d :— \| r : | m :— \|— :— | d :f \| r :d ‖

16. Write out the compounds of *Sum* and *Fero*.

17. Write out present indicative of *avoir* conjugated negatively.
Write out imperfect indicative of *être* conjugated interrogatively.
Write out past definite indicative of *donner* conjugated negatively and interrogatively.

Second Year.

1. (*Boys.*) What is the rate per cent. received for money invested in the 4 per cents. at 83⅛? Ans. 4⅘ per cent.

(*Girls.*) Make out the following account :—

	Answer. £	s.	d.
478 lbs. @ 1s. 0¼d. per lb. - - - -	24	7	11½
299 lbs. @ 1s. 9½d. per lb. - - - -	26	15	8½
175 lbs. @ 8s. 0d. per doz. lbs. - - -	5	16	8
480 lbs. @ £1 10s. 4d. per qr. - - -	26	0	0
Total - - - -	£83	0	4

2. (*Boys.*) If the work done by a man, a woman, and a boy be in the proportion of 3, 2, 1, and if 12 men, 15 women, and 15 boys can complete a certain work in 270 days, in what time would 18 men, 12 women, and 12 boys complete it? Ans. 243 days.

(*Girls.*) Reduce $\frac{3}{7}$, $\frac{1}{11}$, $\frac{7}{99}$, $\frac{11}{250}$ to decimal fractions, and explain why the first three produce recurring fractions.
Ans. ·428571 ; 1·$\dot{7}\dot{2}$; ·0$\dot{7}$; ·044.

3. Multiply 869,875 by 78,946, and test the result by 'casting out the nines.' Ans. 68,673,151,750.

4. As in First Year.

5. Paraphrase—

'*Home* they brought her warrior *dead* :
She *nor* swooned nor uttered cry :
All her maidens *watching* said,
"She *must weep*, or she will die."
Then they praised him soft and *low*,
Called him *worthy to be loved*,
Truest friend and *noblest* foe ;
Yet she neither spake nor moved.'

6. Analyse the above passage and parse the words in italics.

7. Give the meaning of each part of the following words :—*Indestructible, Porosity, Connexion, Indifferent,* and *Presuppose.*

8. Draw a map of Italy.

9. Give some account of the rivers Indus and Volga.

10. When it is noon at Greenwich, what is the time at places in 40°, 180° W. long., and 45° E. long.? When it is 12 o'clock at the North Pole, what time is it at Greenwich?

11. Give dates of loss of Normandy, Magna Charta, battles of Barnet, Lincoln, Lewes, and Evesham.

12. Write a short life of Wiclif, and show what part of his teaching had the effect of stirring up the common people.

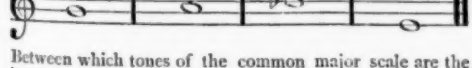
13. What do you know of the Mad Parliament?

14. (*Boys.*) Write out Euclid I., 17.
Show otherwise than by Euclid's method that two interior angles of a triangle are less than two right angles.

(*Girls.*) What are the chief offices of food? Mention a few typical foods?

15. Name eight words, in the spelling of which young children often make mistakes, and explain by what sort of exercises such mistakes may be corrected or avoided.

16. Add a major third above, and a minor third below each of the following notes :—



OR

Between which tones of the common major scale are the following intervals found :—(*a*) major sixths, (*b*) minor sevenths?

17. Decline *loquax, asper, meus, tu.* Compare *audax, superus, diligens, graviter ;* OR
Supply to each of the following nouns an adjective agreeing with it in number and gender :—*année, travaux, parapluie, ardoises, chambre, eaux, faim, promenade.*

Third Year.

1. (*Boys.*) A circular race-path is 1,078 yards round. A and B start, back to back, to run round it. The one runs at the rate of 12 miles and the other at 12½ miles per hour. When and where will they first meet?
Ans. 528 and 550 yards from start ; 1½ mins.

(*Girls.*) If 357 hams each weighing 19 lbs. can be bought for £399, how many hams weighing 17 lbs. can be bought for £210.
Ans. 210 hams.

2. (*Boys.*) What will be the cost of painting a room 32 ft. long, 18 ft. wide, and 11 ft. high, @ 2s. 3d. per square yard, allowing for three windows each 6 ft. × 4 ft., and for two fireplaces each 5 ft. × 6 ft.? Ans. £12 2s. 0d.

(*Girls.*) Subtract ·154 of 11 ozs. from ·077 of 2 lbs. 7 ozs., and give the result as a fraction of 11 lbs. Ans. $\frac{119}{16000}$, or ·0074375.

3. Of an electric cable ⅓ rests on the bottom of the sea, $\frac{1}{15}$ hangs in the water, and 234⅔ yards are employed on land. What is the length of the cable? Ans. 2,691 $\frac{13}{15}$ yds.

4. As in First Year.

5. Paraphrase :—

'"*Have* patience," I replied, "*ourselves* are full
Of social wrong ; and *maybe* wildest dreams
Are *but* the needful *preludes* of the truth :
For *me*, the genial *day*, the happy crowd,
The sport half-science, *fill* me with a faith.
This fine old world of *ours* is but a child
Yet in the go-cart, Patience! Give *it* time
To learn its limbs : there is a hand *that* guides."'

6. Analyse the above passage and parse the words in italics.

7. Give an account of the origin of each of the following words, distinguishing the root syllables from prefixes and affixes, and showing the meaning of each part :—
Withstand, Dishonour, Recapitulate, Mistake, Sublunary, Forgo, Foretell, Retrospection, Universal.

8. Draw a map of the western half of the Mediterranean.

9. Give notes of a lesson on the Soudan.

10. A prisoner in Siberia made his escape and travelled across the continent to Calcutta. Describe his journey.

11. For what events are the years 1513, 1537, 1547, 1554, 1568, and 1603 noted?

12. Give a short life of Wolsey or of Raleigh.

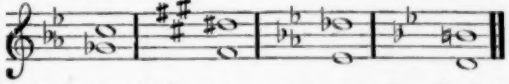
13. Write down a genealogical table of the Tudors.

14. (*Boys.*) Write out Euclid I., 40.
Prove that the line joining the bisections of the sides of a triangle is parallel to the base.

(*Girls.*) What are the best kinds of artificial lighting? State advantages and disadvantages.

15. Write out notes of a lesson on *one* of these subjects :—
(*a*) Ratio, (*b*) English Cathedrals, or (*c*) Bees (*for Infants*).

16. Write below each of the following intervals its name (minor third, etc.) :—



OR

Write (in figures) distinctly over each note and rest in the following passage its value in pulses or fractions of a pulse :—

| s ,m ,l :r ,- ,f | m .s, f :f ., m | r. :d ‖

17. Write out in full the imperative passive of *vincio*, 3rd pers., plural, subjunct. of *malo*, and the 3rd pers., plur., perf., subjunct. of *fio* ; OR
Write out in full the present indicative of *punir*, the imperfect subjunctive of *recevoir*, the pluperfect of *rompre*, and the present subjunctive of *vouloir*.

NEW COMPOSITION STORIES.—STANDARD V.

Suitable for 'Unseen Tests' in Reading also.

139.

THE QUAKER AND THE SEAMAN.—During the war with America, a Quaker was on board an American ship engaged in close combat with an enemy. He preserved his peace principles calmly until he saw a stout Briton climbing up the vessel by a rope which hung overboard. Seizing a hatchet, the Quaker looked over the side of the ship and remarked: 'Friend, if thee wants that piece of rope, thee may have it;' when, suiting the deed to the word, he cut off the rope, and down went the poor fellow to his long watery home!

140.

A NOVEL NOTION.—A certain cattle-station in Queensland being overrun with kangaroos, who ate up all the grass, the owner determined to get rid of them, but how he did not know, since he could not poison them for fear of killing his own cattle. At last he determined to catch an 'old man' kangaroo and dress him up, which he did in an old shirt, a felt hat, and a large bell strapped securely round his neck. The kangaroo was then set at liberty, and, of course, tried immediately to rejoin his herd. This they strongly resented, as they could not quite understand his unsightly dress. Finding it impossible to rid themselves of their companion, they fled, and he after them in hot pursuit, much to the satisfaction of the station-owner, who felt confident that he would not be troubled with kangaroos any more.

141.

A LESSON TO CONQUERORS.—When Edward the Confessor had entered England from Normandy, to recover the kingdom, and was ready to give the Danes battle, one of his captains assured him of victory, adding, 'We will not leave one Dane alive.' To which Edward replied, 'God forbid that the kingdom should be recovered for me, who am but one man, by the death of thousands. No, I will rather live a private life, unstained by the blood of my fellow-men, than be a king by such a sacrifice.' Upon which he broke up his camp and again retired to Normandy, until he was restored to his throne without blood.

142.

A LITTLE KNOWLEDGE IS DANGEROUS.—A mule laden with salt, and an ass laden with wool, went over a brook together. By chance the mule's pack became wetted; the salt melted, and his burden became lighter. After they had passed, the mule told his good fortune to the ass, who, thinking to speed as well, wetted his pack at the next water; but his load became the heavier, and he broke down under it.

143.

DECEIVED BY APPEARANCES.—Not long ago a missionary fell among cannibals, who, after holding a conference, decided to cook him for supper. They communicated their intention to the unfortunate man, who, however, strongly advised them not to devour him, saying he was very unpalatable. 'See,' said he, 'I will give you a piece of my leg to eat, and you will no longer wish to eat me.' With these words he produced a knife, cut a slice from his leg, and sent it the round of the cannibals. The unanimous decision, after tasting it, was to let him go free. The leg was of cork!

144.

AN INDIAN STORY.—An elephant and a goat once quarrelled as to which could eat the most; and to settle the question they went into a meadow. After they had each eaten for a long time, the goat lay down upon a rock to chew the cud. 'What are you doing?' said the elephant, stopping to look at him. 'I am only eating this rock,' said the goat, munching away; 'and when I have done that I am going to eat you.' The elephant, terrified at this dreadful threat, ran away; and since that time he has never dared to enter a town in which there was a goat.

145.

CONSCIENCE-STRICKEN.—An important public examination was taking place, and, according to custom, one of the examiners took up his watch in the gallery above. Thus, unseen by the competitors, he had a complete bird's-eye view of the proceedings. Noticing a candidate cheating, he rang the bell, and spoke thus:—'If the man who has been copying for the last twenty minutes will get up and leave the room, no further notice will be taken of the matter.' A pause—then sixteen rose and departed!

146.

FEATHERED THIEVES.—Not long ago a gentleman, on going to his letter-box, discovered that a letter containing a cheque for £10 had been tampered with, and that the cheque was missing. He immediately came to the conclusion that human thieves had been at work, and gave information to the police at the nearest station. On his return home, however, he examined his letter-box more closely, and then found several tomtits in it; and, on further search, he discovered the missing cheque lying nearly a hundred feet away on the turnpike road, whither it was evident it had been carried by a tomtit, since it bore abundant marks of the bird's beak.

NEW READING TESTS.—STANDARD III.

Suitable for 'Unseen Tests' in Dictation also.

117. When their victim is slain, wolves seem to lose all control over themselves, fighting fiercely for every morsel of the coveted flesh, and attacking each other with the greatest fury. If one should be overcome, he is instantly devoured by the rest; and it is even reported that any animal who is unfortunate enough to dabble himself with the blood of the victim is certain to share the same fate.

118. A little girl was standing upon the beach the morning after her arrival at the seaside, when her father said: 'Well, Annie, of course you know what this piece of water is called?' 'No, papa; indeed I don't,' she replied. 'Well,' said her father, 'this is The Wash.' Annie thought for a moment, and then said, 'Oh, papa! what a long way for mamma to send our clothes every week!'

119. Among all big and terrible snakes, there is none worse to meet with than the beautiful boa constrictor. He is often found near rivers and in marshy places. He can swim, climb, or dart along the ground; so there is little chance of safety for either bird, beast, or fish, once he has seen them.

120. A gentleman in a country town has a small black dog which is very fond of sugar; so his master always puts a lump on the chimney-piece for him at breakfast-time. Nero barks and jumps and stands up on his hind legs, but if it is just out of his reach, he always goes under the table for a footstool, upon which he stands, and then takes it.

121. A wild rabbit was once seen running down a street at its utmost speed, a couple of large rats pursuing it. When the poor creature arrived at the end of the road, it appeared to become quite frightened, and ran into the yard of a public-house. Thereupon the rats gave up the chase, seeking safety in the basement of a house on the opposite side of the street.

122. On certain mountains in America a substance called 'red snow' has been gathered at various times. It looks as if it were drenched with blood; but this appearance is due to the presence of a little plant, which spreads itself with such rapidity that a small quantity will quickly produce the aspect of redness that has given rise to the popular name.

123. Fortunately, as it happened, the bushmen were indulging in eating and drinking, and they did not trouble themselves about the miserable boys any more. So, as darkness came on, George continued to struggle, and at length got one arm free. He then quietly took out his pocket-knife and cut the bonds, taking care to move as little as possible, so as not to attract attention. (H.M.I.'s Test.)

124. The daisy is a hardy plant,
And in the winter time
We find it by the sheltered nooks,
Unhurt by snow and rime.
In Spring it dots the green with white,
It blossoms all the year;
And so it is a favourite flower,
To little children dear.

NEW DICTATION TESTS.—STANDARD IV.

Suitable for 'Unseen Tests' in Reading also.

60.

A novelty for travellers is 'compressed tea.' This is put up by certain Russian firms resident in China. It is made of the fine dust of tea-leaves, but is none the less expensive for all that, for it is compressed by the powerful force of steam machinery into compact tablets, which take up about one-sixth the space which the same amount of loose tea-leaves would occupy. These are enclosed in tinfoil and finally packed in metal-lined cases.

61.

A manufacturing jeweller recently remarked that some of his workmen had begun to wear their hair unusually long. He watched them closely, and discovered that they frequently greased their hands, rubbed them over with gold filings and diamond dust, and then carefully passed their hands through their hair. It was their custom at night to comb their hair with fine combs, and collect and sell the gold particles and diamond-dust stolen in the manner above described.

62.

The Pope is a great reader of newspapers, and takes a keen interest in the internal affairs of all the countries of Europe. In the evening his favourite secretary goes to his bedroom with the newspapers of the day, and reads aloud, often until the early morning, while the Pope remains propped up in bed, with woollen wraps around him, listening attentively to what is read, and making numerous comments.

63.

The male and female ants have wings, but the workers, which are nine to one of the others, have none. The best time to see the winged ones is about the close of summer and the beginning of autumn. Ants are reared from eggs. The work in connection with this raising makes them very busy during the warm months. This work includes making, enlarging, and repairing their dwellings, and also the search for food.

64.

It is quite a mistake to suppose that children grow only when they are asleep. They do not grow nearly as much while asleep as while running about in the fresh air and sunshine. Light, air, and exercise are all necessary for growth, and those children who live out-of-doors grow fastest. It has been proved that in October and November the average child grows only one-fifth as much as it does in June and July, when, of course, it is far more out in the open air.

65.

Many of us forget that salt is necessary for our constitutions. It should be used regularly as an article of diet, for although it is put into our food, a large enough quantity is not obtained in this way to supply all that is necessary. Many animals will take long journeys to obtain salt in larger quantities than they can get in their usual locality; so we see that the desire for salt is a natural craving of animal life.

66.

Toronto has, for the time being, made itself notorious by the strict enforcement of what, in the eyes of the younger generation, is looked upon as a most absurd regulation. A curfew-bell is to be rung throughout the province each evening at nine o'clock, and any young person under the age of seventeen found in the streets without the permission of his or her parent or guardian is liable to fine, imprisonment, or a year or two in a reformatory.

67.

While plodding on our way, the toilsome road of life,
How few the friends that daily there we meet;
Not many will stand by, in trouble and in strife,
With counsel and affection ever sweet.
But there is one whose smile will ever on us beam,
Whose love is dearer far than any other;
And wherever we may turn, this lesson we will learn,
A boy's best friend is his mother.

STANDARDS V.–VII.

51.

A regular slave-mart still exists in many country districts of Finland. Once a year such paupers, aged people, and lunatics as cannot support themselves are put up to public auction, and consigned to those people who will board them at the lowest price offered by the parish authorities. The helpless creatures are made to work as much as possible by the owners, who have the right to chastise them, and who are usually most inhuman in their treatment of them. The aged folk are physically unable to perform much hard work, but the lunatics, though mentally deranged, are often bodily capable of undergoing a great deal of strain. Consequently, the farmer shows little mercy towards them.

52.

Many men seem to have no faith in themselves; consequently no assertiveness, no independence, no pluck, and no push. They are afraid to stand up and speak for themselves, preferring to lean on others; they are afraid to make an investment because of the possibility of failure; they are afraid to tell what they can do, as they might make an error in doing it; they are cowards in every sense of the word. This is often the result of early training. A boy naturally timid is kept in the background so persistently, and his mistakes are so severely criticised, that he grows up into an entirely useless man.

53.

Sheep are not commonly regarded as beasts of burden, but in North-west India thousands of sheep carry for many miles the commodities purchased by the sale of their own wool. The mountain paths among the hills are so precipitous that the sheep, more sure-footed than larger beasts, are preferred as burden-carriers. The load for each sheep is from sixteen to twenty pounds. They are driven from village to village with the wool still growing, and in each town the farmer shears as much wool as he can sell there, and loads the sheep with the grain which he receives in exchange. After his whole flock has been sheared he turns towards home.

54.

The Afghans walk with a long, springy stride, that shows they are used to climbing ascents, and their gaze meets yours without the timid, fawning glance of the Indian. Their deep-set eyes glare from under shaggy brows, their huge noses are of Jewish type, their thick moustaches droop at the corners of the mouth, towards a coarse, rugged chin. Their mouths are large—immense, in fact—but never weak; and when the large lips open, there comes a flash of strong, white teeth. There is a murderous suggestion in the grim smile, and after a glance from out of those lurid eyes, you find it only natural when you see the array of deadly weapons which the mountaineers carry in their belts.

55.

A cultivated mind may be said to have infinite stores of innocent gratification. Everything may be made interesting to it by becoming a subject of thought or inquiry. Books, regarded merely as a gratification, are worth more than all the luxuries

on earth. A taste for literature secures cheerful occupation for the unemployed and languid hours of life: and how many persons in these hours, for want of innocent resources, are now impelled to coarse and brutal pleasure! How many young men can be found who, unaccustomed to find a companion in a book, and strangers to intellectual activity, are almost driven in the long, dull evenings of winter, to haunts of intemperance and depraving society.

56.

Of all the precious stones, perhaps the most esteemed amongst the men of old was the emerald. Of this gem, tradition declared that if a serpent by any chance fixed its eye upon its dazzling surface, it became blind; yet with all its bewildering gleams, and the lofty positions it has occupied in sceptres and in crowns, it is but formed of several simple substances, every one of which is to be found in the very commonest cast of rock. There is also the King of Jewels, the diamond, which is not only the most rare, but also the most beautiful of all the gems that have ever yet been discovered upon the face of this planet. Yet it is only a piece of pure carbon, or, in other words, charcoal crystallised.

57.

Appointments are easy to make, but oftentimes inconvenient and difficult to keep. Therefore let them be few, and such as are of indispensable necessity. We refer to business appointments. The same rule applies—with less stringency, however—to appointments for pleasure. It is desirable to have as much of your time your own—reserved to your own free and unrestricted disposal—as possible. In actual life, everyone finds that when engagements are heedlessly entered into to be performed at some time a little in the future, many unforeseen causes may intervene to render their fulfilment irksome and unpleasant, converting an anticipated pleasure into a hardship.

58.

There is a gentle element, and man
May breathe it with a calm unruffled soul,
And drink its living waters till the heart
Is pure. And this is human happiness!
Its secret and its evidence are writ
In the broad book of nature. 'Tis to have
Attentive and believing faculties;
To go abroad rejoicing in the joy
Of beautiful and well-created things;
To see, and hear, and breathe the evidence
Of God's deep wisdom in the natural world!

THE 1894 SCHOLARSHIP EXAMINATION.

BY DR. GEORGE BEACH, M.A.,

Co-Author of 'A Manual of our Mother Tongue,' 'A Girls' Arithmetic.' Author of 'Elements of English,' 'Entertaining Readers,' 'Historical Readers,' etc.

I. From many letters received, we know that a considerable number of our readers have hitherto deferred making arrangements for a seat at the Scholarship Examination, and numerous others have not decided what training college they will enter if successful. Some have not even commenced special study.

This course of conduct is most decidedly unwise—not to use a stronger term. If the delay arise from those in authority, be insistent and importunate, until by your continual coming you weary them into efficient action. The Scholarship Examination will commence on Wednesday, 4th July 1894, but Form XIII. must be filled up and returned to the department before 1st May. The marks for Repetition, Reading, and Teaching should be secured at next school inspection; three notes of lessons should be ready. By arrangement with H.M.'s Inspector, last year's marks are often allowed to count. External candidates, non-pupil teachers, will read and recite at the examination itself, but they will not be tested in practical teaching.

The sewing will also be tested at the Examination. Care must be taken that a due entry of the candidate's intention to sit is inserted in the School Examination 'Form IX.'

Theoretical Music will be an ordinary paper, but the practical portion may perhaps be previously tested.

Seats for the Map Drawing and Science subjects should be now secured. Apply, if you are a private student, to the secretary of the most convenient class or centre. The fee will probably be half-a-crown.

II. (*a*) **Valuable information of a copious quantity is now being inserted in the 'Girls' Mistress,' published every Saturday; price 1d.**

(*b*) It will save us much trouble if our correspondents will kindly note the following points, queries respecting which regularly recur:—

(α) Any candidate who unfortunately passes the Scholarship Examination too low for training college admission, has at least two further tries left, if he wish to improve his position on the list.

(β) Candidates, who *more* unfortunately fail once, may (1) extend their apprenticeship for another year in the same school, (2) be transferred as a pupil teacher to another school, (3) until the next Q.S. Examination become an assistant in any school, or (4) abandon the profession.

(γ) Candidates, who *most* unfortunately fail twice, may (1) abandon the profession, or (2) pass an examination under Article 51 of Code 1893. The Cambridge Senior Local is the best for this purpose, and the easiest selection of subjects is the preparatory ones and sections A, B, and G.

Further particulars may be obtained from the local secretaries, or the Secretary, University of Cambridge Local Examinations, Syndicate Buildings, Cambridge.

(*c*) Once more we call attention to the complete analyses of all the questions set during the last twelve years. These have appeared in our columns during the last twelve months, and should be carefully studied. No industrious student with merely common abilities can fail to secure a good place if these investigative details are duly mastered.

There only remains *Needlework, etc.*, to be treated of.

III. *Analysis of Needlework, etc. Questions set during the last eight years.*

(*a*) *Cut out in paper, and make up by tacking—*

(α) A woman's gored flannel petticoat (half-size). (1893.)

(β) An infant's long flannel (half-size). (1893.)

(γ) The front, half the back, and one short sleeve of a frock body, suitable for a child of three years of age (1890)—(1886) for child of five years.

(δ) Half the front and half the back of the upper part of an infant's nightgown. Make up one sleeve and fix it into the garment (full size). (1889.)

(ε) Half a chemise, for a child six years old, indicating in the garment the selvedge way of the material. (1888.)

(ξ) A pair of drawers for a child three years of age. (1887.)

(*b*) *Patch.*

Set in a calico patch not less than two and a half inches square. (1893.)

(*c*) *Making-up*—
- (α) Calico into the form of a woman's apron, showing hemming, seaming, gathering or pleating, stitching and tuck-running. Make a button-hole and sew on a button. (1893), (1887), (1886).
- (β) Calico sleeve of an infant's nightgown. (1892.)
- (γ) Wristband of shirt (half-size), stitch it, and make a button-hole. (1891.)

(*d*) *On the calico supplied*—
- (α) Work two inches of stitching and two of feather-stitching. Hem the square and make a button-hole. (1890.)
- (β) Show hemming, gathering, setting-in, stitching, and tuck-running. Sew on a tape. (1889.)
- (γ) Show hemming, seaming, feather-stitching, stitching, and button-holing. (1888.)

(*e*) *Marking.*
- (α) Mark the letters E and D, cross-stitch. (1893.)
- (β) Mark the letters V and R. (1892.)
- (γ) Mark the letters R and C. (1890.)
- (δ) Mark the first letter of your surname. (1889.)
- (ε) Mark the letter A.

IV. *Hard or catchy words set in the Dictation Exercise during last twenty-three years.*

accession
alleged
allegories
arbitrary
accommodates
acknowledgment
agreeable
allusion
illusion
accelerated
apparent
azure
alligator
annihilated
analysis
amiability
abbots
affect
effect

blazon
bifurcated
beneficent
benevolent
brusque
buxomly

chary
comical
conical
conspicuous
concernment
chequered
controversy
capricious
council
counsel
circumstantial
crises
current
currant
conjugal
conscious
cavaliers
chivalry

depreciation
discipline
diffusion
demean
disinterestedness
dormant
develop
envelope
disapprobation
democracy
determinate

equilibrium
efficacy
expatiate
exempt

erudition
era
exaggerate
essence
equivocation
exuberance
enthusiasm
episodes

fulfil
firs
furs
furze
foliage
facility
fabric
fictitious
factitious
factious

grandeur
gesture
gorgeous
gaudy
guage
gaol
goal
grotesque

horizon
orisons
human
humane
hoards
hordes
homogeneous
hydraulic

inexcusable
irresistible
ingenious
ingenuous
inadequate
intervene
incontestible
indissolubly
immunity

judicature
jaguar
jeopardy
jocund
juridical
juvenescent

khan
kilolitre
kleptomania

licensed
lustre
licentious

literary
literally
languidly
lax
lac (lakh)
lily

militia
marquises
mitred
malevolence
mysterious
metaphor
martial
marshal
malefactors
mosaic

nondescript
nomenclature
nausea
nascent
naphtha
nefarious
necessity

obeisance
obstacles
opponents
occasions
occurred
oblique
octogenarian
offal

punctuate
panegyrical
piracies
pliant
prevalent
parasites
professionally
perceptions
populous
populace
prejudices
partialities
progeny
polemic
permanent
possessors
polity
policy
privilege
parroquets
pelicans
precedent
president

quadrennial
quarantine
querulous

quiescent
quixotic

rapine
redeemed
reminiscences
resources
referring
repugnant
revocable
rhythm

scabbards
spheroid
cemetery
symmetry
solicitous
sheriffs
scrutineer
scheming
sensibility
saunter
superfluous
sculptor
sculpture
sordid
superintendence
scientific
scurrilous
specimen
statue
stature
statute

termagant
tableau
tesselated
tapestry
taciturnity
theatre
tautology

unattainable
undistinguishable
uncontrollable
utensil
utopian
ubiquitous

vigilant
vial
venal
venial
vivacity
vague
vocabulary
vicinity

whimsically
welfare
waive
wassail
witticism

This exercise generally contains about 150 words, which are dictated at the rate of eight or nine per minute. The passages vary greatly in difficulty, but, as a rule, contain few unusual or technical words. In addition to the above words, the favourite catches are upon the terminations *-ant, -ance ; -ant, -ent ; -ance, -ence ; -able, -ible ; -ate, -ite ; -ary, -ory ; -eive, -ieve ; -eur, -ure ; -ent, -ence ; -esque ; -esce ; -ise, -ize ; -ique ; -ous, -us ; -our, -or ; -ue ; -m, -mn ;* and upon words whose variant spelling differentiates the meaning of identical sounds, such as *rain, rein, reign*, etc.

The passage must be properly punctuated ; there must be no writing between lines, no division of words between two consecutive lines, and no abbreviations, for the space is ample. Omissions, erasures, and Americanisms are accounted mistakes.

V. THE MANCHESTER SHIP CANAL.

The subjoined description will, it is hoped, be useful, not only to scholarship candidates, but to teachers in general. We have to acknowledge, with many thanks, the kind courtesy of Marshal Stevens, Esq., the manager of the canal, who has placed every facility of obtaining information at our disposal.

(*a*) *Inception of the undertaking.*—As far back as 1721, an Act of Parliament was procured to dredge, widen, and straighten the rivers Mersey and Irwell, in order to render them navigable. This, however, together with the schemes of 1824, 1838, 1843, and 1877, proved abortive, owing to lack of financial support. To the late Mr. Daniel Adamson belongs the credit of bringing the scheme to a practical commencement. In 1882, through his efforts, the plans of Mr. Leader Williams, C.E., to construct a locked canal along the southern shore of the Mersey estuary were accepted, and the Bill to authorise its construction was published.

(*b*) *Parliamentary difficulties.*—Naturally, in some quarters the Bill aroused much opposition, especially from the Corporations of Liverpool and Birkenhead, Mersey Docks and Harbour Board, London and North-Western Railway Company, and the Shropshire Union Railways and Canal Company.

Accordingly the Bill was thrown out in 1883 and in 1884; but in August 1885 it traversed all its stages, and received the royal assent, subject to a proviso that £5,000,000 should be actually subscribed before the work commenced. Subsequent events proved this to be a wise addendum.

The parliamentary expenses incurred, using the phrase in a broad sense, **were certainly no less than** £150,000, and perhaps reached £200,000.

(*c*) *Organisation and financing of the project.*—The estimated cost, including the purchase of the famous Bridgewater Canal, etc., was £8,200,000; but, as a matter of fact, the outlay has reached the enormous sum of £15,000,000, towards which the Manchester Corporation contributed about £5,000,000 at a time when failure of resources was imminent.

Most of the other capital was raised in £10 shares or by borrowing, all sections of Mancunian society contributing. Mr. Adamson was fitly appointed chairman of the company, and, on his retirement, Lord Egerton succeeded to his office.

The first sod was cut on 11th November 1887, on the site of the Eastham docks, and the complete opening took place on 1st January 1894.

The Suez Canal, estimated to cost £6,000,000, actually required £16,000,000, despite the relative cheapness of labour. It was commenced in April 1859, and opened in November 1869.

(*d*) *Means of Construction.*—In daily use were 100 steam-driven machines, 173 locomotives with 6,300 waggons running on 223 miles of specially-constructed railway, 194 steam cranes, 182 steam engines, and 209 steam-pumps. These consumed fuel at the rate of 10,000 tons per month. The workmen engaged varied in number from 15,000 to 19,000, and for their accommodation temporary wooden towns arose, only to disappear in due course.

(*e*) *Amount of Work and Material.*—About 40,000,000 cubic yards have been excavated, 10,000,000 of which were of solid sandstone rock. At Runcorn the deepest cutting (66 ft.) occurs, and at Latchford for nearly 2,600 yards the depth is 55 ft.

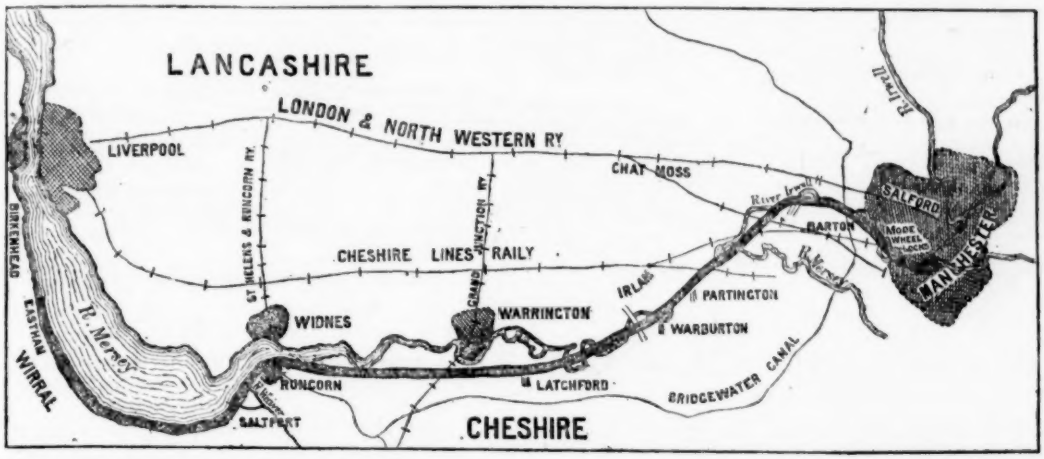
Of bricks 70,000,000, and of concrete 1,250,000 cubic yards were expended. Altogether the solid content of brickwork amounts to 175,000 cubic yards, and of masonry to 220,000 cubic ft. The amount of clay used was simply incalculable.

The deepest cutting (90 ft.) in the Suez Canal occurs about in mid-isthmus.

(*f*) *The Canal.*—The entrance from the tide-way is at Eastham, six miles up from Liverpool, and the sea-channel to

this point has been dredged, so as to allow large vessels to enter during average tides, and small vessels at any time.

The three parallel locks here are respectively 600 ft. × 80 ft. 350 ft. × 50 ft., and 150 ft. × 30 ft., and at Latchford, Irlam, Barton, and Mode Wheel there are two parallel locks measuring, one 600 ft. × 65 ft., and the second 350 ft. × 30 ft. There are thus five sets of locks, or eleven in all. At Eastham, vessels enter the locks with the tide rising 14 ft. above the old dock sill at Liverpool; from here to Latchford, a distance of 21 miles, the canal is tidal. From Eastham to Manchester the ascent is 60½ ft. For the first 10 miles from Eastham to Saltport, at the mouth of the Weaver, the canal, frequently flowing along the



river channel, follows the southern bend of the Mersey, thence another 4 miles, still adjacent to the river, brings it to Runcorn. From this place it crosses the open for 11½ miles in a straight line to within a mile of Warburton. Nearly midway between these latter places will be the Warrington Docks, situated due south of that town, and about a mile from its centre. Here the Latchford Canal again connects the great waterway with the Mersey. Now turning north-east in 7 miles Barton Swing Aqueduct is reached, over which the Bridgewater Canal is carried, and 3 more miles of a south-easterly course brings to the end of the Salford Docks, the total length thus being 35½ miles, whilst that of the Suez Canal is 100 miles.

The Egyptian undertaking, although it had many difficult spots to pass over, nevertheless traversed many lakes and much sandy country.

The Manchester Canal has a minimum depth of 26 ft., average width at surface of 172 ft., minimum width at bottom 120 ft., but between Barton and Manchester the surface width increases to 230 ft. and the bottom width to 170 ft. The bridges have a clear headway of 75 ft. The Suez Canal is of the same depth, but the minimum bottom width is only 72 ft.

(*g*) *Engineering Triumphs.*—Near Warrington and near Irlam railways had to be elevated and carried over huge bridges, which, although considerably on the skew, span openings of from 266 ft. to 137 ft. The swing bridges are all moved by hydraulic power, as is also the Swing Aqueduct at Barton. This is a huge iron trough, which is made to do duty as a section of the Bridgewater Canal. To allow high-masted vessels to pass along the lower canal of the trough, water-tight gates are inserted, and the ponderous mass, with the immense weight of enclosed water, is swung bodily aside.

(*h*) *Docks.*—The total, already constructed, water area is 110 acres, and the length of the quays 6 miles. In addition, the great width between Barton and Manchester makes its length one huge dock; also the Weaver Embankment pens up the water in that river as far as Frodsham, forming a wide sheet of water three miles along, available after dredging as a dock for ships of any magnitude.

The '*Port of Manchester*' extends as far as and includes Runcorn.

(*i*) *Financial Prospects.*—The canal will be, of course, an immense boon to Lancashire and Cheshire in general. Many ship-owners and companies have already made arrangements for running vessels from Scotland, Ireland, the Continent and America; and the great railway systems will be shortly connected.

For the coal fields of Lancashire, Cheshire, Derbyshire, and South Yorkshire, for the salt fields of Lancashire and Cheshire, and for the chemical industries of Widnes, St. Helens, and Runcorn, the ship canal will be the most facile way to the sea.

The average time taken to traverse the whole length, inclusive of delays at locks, is a little over seven hours. Navigation will go on by night as well as day, the canal being lighted by electricity.

'*Commerce*' gives the following details of total saving per ton in transit from Liverpool to Manchester, *viâ* the canal—

——	Cotton.	Wool.	Loaf Sugar.	Raw Sugar.	Bacon.	Tinned Meats.	Tea.	Wheat.	Oranges.	Petroleum.	Tallow.	Iron Ore.	Timber.
	s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*
Present Cost - - -	13 8	16 5	17 11	12 2	15 0	17 5	18 2	9 11	15 0	14 5	13 6	6 11	9 5
Ship Canal Cost - -	7 0	7 9	6 8	4 11	6 7	8 0	8 7	4 10	0 2	5 11	5 10	2 10	4 9
Saving - - - -	6 8	8 8	11 3	7 3	8 5	9 5	9 7	5 1	8 10	8 6	7 8	4 1	4 8

The following estimate of the traffic and revenue for 1900 has been made by the manager, Mr. Marshall Stevens, and in corroboration, a remarkable fact greatly to the canal's advantage must be noted. The level of the dock-sills at Liverpool is so high that vessels of large draught can only enter upon a full tide. It will, therefore, frequently happen that of two ships crossing the Mersey Bar at the same time—one bound for Manchester and the other for Liverpool—the former will be discharging her cargo before the latter is laid alongside the quay.

Revenue from 9,649,316 tons	= £1,492,282
,, ,, Bridgewater Canal	= £ 65,000
,, ,, rent of land	= £ 50,000
Gross Total Revenue	= £1,607,282
Working Expenses	= £ 104,200
Net Revenue	= £1,503,082

Mr. Stevens also estimates the net revenue for 1895 at £501,000.

(*f*) *Prospects of Liverpool.*—It is reasonable to suppose that, although there will be a certain important diversion of traffic, the mother seaport, on account of the great excellence of its market organization, especially as regards cotton, grain and provisions, will retain the handling of much of the present inward and outward cargo.

Moreover, until the recent depression, Liverpool's shipping business had so increased as to threaten to tax the controlling abilities of the authorities, and certainly the sure development of such a vast centre of population as Lancashire, will further tend to maintain the prosperity of 'The Queen of the Mersey.'

VI. We have made arrangements, merely to suit our own readers, and with no desire to interfere with existing agencies, for tuition based upon these articles, routines and questions by experienced teachers and graduates. Names of intending pupils should be sent to DR. G. BEACH, M.A., *Stanley Mount, Macclesfield.* The fees *to be paid in advance* are 1*s.* 6*d.* per week, or 5*s.* 6*d.* per month, or 15*s.* 9*d.* per quarter, or £1 6*s.* 3*d.* the course from the present date.

VII. *For Correspondence, see end of Certificate Article.*

SELECTED GOVERNMENT QUESTIONS.

FIRST WEEK.

1. Write in Large-hand the words '*Victoria Nyanza.*'
Write in Small-hand '*An honest tale speeds best, being plainly told.*'

2. Take the following words :—'*For, Because, Therefore, Since, As, But.*' Place each of them so that it shall serve as a conjunction introducing a subordinate sentence, and say in what relation this sentence stands to the principal sentence with which it is connected.

3. Draw an outline map, with lines of latitude and longitude, showing the coast from Solway Firth to Hartland Point, and the watersheds which divide its river basins from those of rivers flowing elsewhere.

4. Name some country in the same latitude as England, and compare the climate, productions, and people, with those of our land.

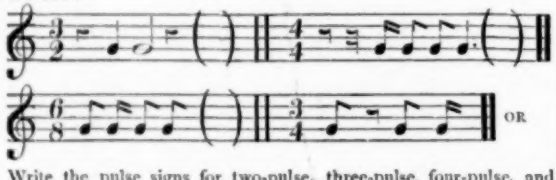
5. Give dates, or approximate dates, and names for the following :—
(*a*) A declaration by Parliament that the King's proclamations were to be as valid as Acts of Parliament.
(*b*) A Treaty giving to England the right of trading in slaves, and the possession of Gibraltar and Newfoundland.
(*c*) The Ministry of Clifford, Arlington, Buckingham, Ashley, and Lauderdale.
(*d*) The Union, in matters of law, between England and Wales.
(*e*) A company which, in effect, offered to pay off the National Debt.

6. In what reigns did Dryden, Chaucer, Sir Walter Scott, Sir Philip Sydney, Thomas Carlyle, and George Herbert live respectively? Mention the writings of any two of them.

7. It is sometimes said that one of the best ways of teaching history is by means of biography. Explain this. Name five or six persons whose biography would throw great light on the history of the 18th century, and give a slight sketch of *one* such biography.

8. Describe the best system of drill and physical exercises which you know, and say what sort of apparatus, either for use in school or in the playground, would be of most service in such exercises.

9. Complete each of the following bars by adding one note at the end :—



Write the pulse signs for two-pulse, three-pulse, four-pulse, and six-pulse measure.

10. Find the difference between 11·5 of ·6 of £3 7s. 9d., and $2\frac{3}{8}$ of £27 8s. 6½d. Ans. £45 6s. 9½d.

11. Find, by Practice, the cost of 27 tons 16 cwt. 32 lbs. at £3 17s. 10½d. per cwt. Ans. £2,166 0s. 9d.

12. (*Men only.*) Write out Euclid I., 18.
What is the objection to the use of algebraical processes in demonstrating the propositions of the Second Book?

(*Women only.*) A teacher allowed herself only from £8 to £10 a year for her clothes. Describe the materials she would buy and the economies she would practise, and give an approximate account of the details of the expenditure.

13. (*Men only.*) Express algebraically :—The fourth power of the sum of two numbers (*a* and *b*), together with twice the product of their squares is equal to the sum of their fourth powers, together with four times the product of their product, and the square of their sum. Verify this also: When $a = 2$, $b = 3$. Ans. 697.

(*Women only.*) Name the warmth-giving, bone-forming, and flesh-producing elements of our ordinary food. Give examples of our ordinary food in which each of these elements is found in the largest proportion.

14. (*Men only.*) Solve $\frac{(x+a)(x+b)}{x+a+b} = \frac{(x+c)(x+d)}{x+c+d}$.

Ans. $\frac{cd(a+b) - ab(c+d)}{ab - cd}$.

(*Women only.*) Why is it judicious to wear flannel over the chest, and to take special care that the feet of children should be kept dry and warm?

15. (*Men only.*) Find the area in acres, etc., of a field the sides of which are 270, 360 and 450 yards respectively.
Ans. 10 acres 6 pls. 18 yds. 4 ft. 72 ins.

(*Women only.*) What are the most common defects in the working of a button-hole, and how would you prevent them being committed?

16. Write in French :—
(*a*) I am very fond of reading.
(*b*) I see him every day.
(*c*) In what year were you born?
(*d*) She began to cry bitterly.
(*e*) They did not give these books to you.
(*f*) Which of these coats is yours?

17. (*a*) Put into the singular number :—
(α) Ses petits pieds blancs. (β) Leurs drapeaux tricolores.
(*b*) Put into the plural number :—
(α) Le cheval de l'ecuyer. (β) L'hote du paysan.

SECOND WEEK.

1. Write a short essay on one of these subjects :—
(*a*) Any memorable place, city, castle, or battle-field which you have visited.
(*b*) The use of pictures in teaching.
(*c*) Colonization.

2. Give some rules for determining the case of relative pronouns in a sentence. Give examples of sentences containing relative pronouns in different cases.

3. What have been the chief changes in the political map of Europe since 1815 A.D.? What are the great divisions of the people of Europe according to (1) Race, (2) Language, (3) Religion?

4. State briefly what is meant by constant winds and ocean currents. The Gulf Stream is said to influence the climate of these islands. How would you explain this?

5. What events and persons are referred to in the following quotations? Give dates :—
(*a*) 'The King
Drew in the petty princedoms under him,
Fought, and in twelve great battles overcame
The heathen horde.'
(*b*) 'From Richard's night to Bolingbroke's fair day.'
(*c*) 'Then Denmark blessed our chief
That he gave her wounds repose.'
(*d*) 'Your highness pleased to forget my place,
And struck me in my very seat of judgment.'

6. In what way did James II. act unconstitutionally? What safeguards against like action were provided on two subsequent occasions?

7. In what ways may success in class teaching be promoted by studying the characters of children?

8. Explain any way you know of making clear to the eye the process called multiplying $\frac{2}{3}$ by $\frac{1}{4}$.

9. Write the signatures of the following keys :—A♭ major, C minor, E major, G minor ; OR
If the first note of each of the following passages be regarded as t_1, what will the others become ?—

(*a*) **fe, s, r, l, t, d', fe, l, fe, m, d, t_1**

(*b*) **m, f, s, ta, l, d', ta, l, s, ta, l, m, f_1**

10. A tradesman bought 451 articles at £3 15s. 7d. each, paid £3 13s. 4d. for the carriage, and sold them at £4 7s. 7½d. each ; how much did he gain ? Ans. £267 17s. 5½d.

11. Divide ·02156 by ·0022, and find the square root of $154751\frac{77}{169}$. Ans. 9·8 and $393\frac{5}{13}$.

12. (*Men only.*) Write out Euclid II., 4.
ABCD is a square, ABE an equilateral triange. If EC, ED be drawn, the triangle DEC is isosceles.

(*Women only.*) Give a recipe for making a boiled batter-pudding, giving exact quantities, method of preparing, and time and manner of boiling.

13. (*Men only.*) Write down the factors of

	Answers.
$x^2 + 3x - 10$	$(x + 5)(x - 2)$.
$x^6 - 1$	$(x + 1)(x - 1)(x^2 - x + 1)(x^2 + x + 1)$.
$9x^2 + 15x - 14$	$(3x + 7)(3x - 2)$.

(*Women only.*) State the annual income on which, in your opinion, a retired schoolmistress could live in comfort in her old age ; and the methods of saving and investment in her days of full work, and salary by which she could provide that income on retirement.

14. (*Men only.*) Show that $x^4 + 81$ is never less than $18x^2$, and that $a^3 + b^3 = 9ab - 27$ if $a + b + 3 = 0$.

(*Women only.*) Give recipes for the following :—To remove fruit-stains, ink, and iron-mould from linen ; to wash flannel ; to clean woollen cloth.

15. (*Men only.*) The radius of a circle is 15 ins. Find the diameter of a circle, the area of which is three quarters of the area of this circle. Ans. 25·98...ins.

(*Women only.*) Write out directions for making a shirt for a boy four feet six inches high.

16. Trace the conquest of Palestine by the Israelites. In what respects did it exceed, and in what did it fall short of the national expectations ?

17. What are the two main objects of the Absolution, and what are its four chief divisions ?

THIRD WEEK.

1. Paraphrase this passage :—

Earth has not anything to show more fair,
Dull would he be of soul who could pass by
A sight so touching in its majesty :—
This city now doth like a garment wear
The beauty of the morning, silent, bare,
Ships, towers, domes, theatres, and temples lie
Open unto the fields and to the sky,
All bright and glistening to the smokeless air ;
Never did sun more beautifully steep,
In his first splendour, valley, rock or hill ;
Ne'er saw I, never felt, a calm so deep ;
The river glideth at his own sweet will ;
Dear God ! the very houses seem asleep ;
And all that mighty heart is sleeping still.

2. Write from dictation the following passage :—

Whatever I have tried | to do in life, | I have tried | with all my heart to do well ; | whatever I have devoted myself to, | I have devoted myself to | completely ; | in great aims and in small, | I have always been | thoroughly in earnest. | I have never believed it possible | that any natural or improved ability | can claim immunity | from the companionship of the steady, | plain, | hard-working qualities, | or can hope to gain its end without them. | There is no such thing | as such fulfilment | on this earth. | Some happy talent, | and some fortunate opportunity | may form the two sides | of the ladder | on which some men mount, | but the rounds of the ladder | must be made of stuff | to stand wear and tear. |

3. State the causes of the difference between :—(1) Spring tides and Neap tides, (2) and between the tides (*a*) in the Atlantic Ocean, (*b*) in the Pacific Ocean, (*c*) in the British Seas, and (*d*) in the Baltic.

4. Ships come into English ports from Quebec, Calcutta, Cape Town, Adelaide, and Belfast. What are their probable cargoes ?

5. When and under what circumstances were the following battles fought :—Aylesford, Barnet, Corunna, Vinegar Hill, and Lexington ?

6. What were the points of difference between Charles I. and the Long Parliament ? Who were the most prominent advisers on either side ?

7. Give a list of the maps, pictures, diagrams, and apparatus, which you think ought to be provided in a well-furnished school-room.

8. What is meant respectively by physical, commercial, mathematical, and industrial geography ? Say which of these seems to you most important, and why ?

9. Write below each of the following intervals its name :—

B ; E_1	B ; D_1	F^1 ; $G\sharp$	C ; $G\sharp$; OR
t ‖ m	**f' ‖ se**	**t ‖ r**	**d' ‖ se**

10. Find the value of 51 bushels 1 peck 1 gal. 3 qts. at £1 3s. 9½d. per peck. Ans. £244 13s. $6\frac{3}{4}$d.

11. How many days will it take 75 men to excavate a canal 4 miles long, 10½ feet wide, and 9 feet deep ; 37½ days having been required by 105 men to excavate a canal 1,400 yards long, 24 feet wide, and 5½ feet deep ? Ans. 189 days.

12. (*Men only.*) Write out Euclid I., 23.
AB bisects CD at right angles to B. P is a point within the angle ABC, and CP produced cuts AB in E. Show that the difference between ED and EP is greater than that between any other two lines drawn from P and D to meet AB.

(*Women only.*) A teacher at the age of 22 determines to put by £10 a year, and when she has arrived at 27 to increase her savings to £20 a year. Say, approximately, and without calculating the amount, what annuity this would enable her to obtain for herself after reaching the age of say 52 ? Supposing she did not prefer to subscribe for an annuity, what other ways are there of investing these savings, and what income would they produce ?

13. (*Men only.*) Add together $\frac{1}{a-b} + \frac{1}{b-c} + \frac{1}{c-a}$.

Ans. $\frac{ab + bc + ca - a^2 - b^2 - c^2}{(a-b)(b-c)(c-a)}$.

(*Women only.*) On what weekly wages can an artisan maintain in comfort, himself, his wife, and four children between the ages of four and ten ? In what proportion should he distribute those wages in rent, food, education of his children, recreation and savings ?

14. (*Men only.*) A regiment has sufficient food for m days ; but if it were reinforced by p men, it would have food enough for n days only. Find the number of men in the regiment. Ans. $\frac{np}{m-n}$.

(*Women only.*) What do you understand by the term 'Domestic Economy' ? What instruction have you received as a pupil-teacher (or otherwise) on this subject ?

15. (*Men only.*) A road runs round a circular shrubbery. The outer circumference is 440 ft., and the inner 352 ft. Find the area of the road. Ans. 616 sq. yds.

(*Women only.*) To what extent has cutting-out been taught in your school ? Explain any successful plan adopted to give children a practical knowledge of this subject.

16. Write out in French words (*a*) the numerals from 1 to 30,
(*b*) the names of the months,
(*c*) the days of the weeks,
(*d*) present and perfect tenses of *être, porter, recevoir, pouvoir.*

17. Give any rules that will assist a scholar in learning the regular French conjugations.

FOURTH WEEK.

1. Parse this sentence :—

'*When beggars die there are no comets seen,*
The heavens themselves blaze forth the death of princes.'

SCHOLARSHIP OR FOURTH YEAR ROUTINE FOR FEBRUARY, 1894. (MEN AND WOMEN.)

DAYS	FIRST WEEK			SECOND WEEK			THIRD WEEK			FOURTH WEEK		
	I.	II.	III.	I.	II.	III.	I.	II.	III.	I.	II.	III.
MONDAY	Simultaneous Quadratics — Revise Domestic Economy	History from 55 B.C. to 449 A.D.	'De Bello Gallico,' Chapters 1 to 6, *or* 'La Jeune Sibérienne' pp. 5 to 13	Simultaneous Quadratics — Clothing and Washing	Historical Dates to 827 A.D.	Latin *or* French Grammar	Problems involving Simultaneous Quadratics — Savings and Investments	History from 449 to 827 A.D.	'De Bello Gallico,' Chapters 7 to 12, *or* 'La Jeune Sibérienne,' pp. 14 to 21	Simple Equations — Clothing and Washing	History from 827 to 1066 A.D.	Latin *or* French Grammar
TUESDAY	Euclid's Definitions, Axioms and Postulates — Practise Needlework	Map of Scotland	Science *or* Revision	Props. 1 to 4 of Euclid, Book II. — Stocking-mending	Climate and Productions of the British Possessions	Science *or* Revision	Deductions on Euclid, Book I. — Paper Pattern of a Plain Night Shirt	Map of United States	Science *or* Revision	Props. 5 to 7 of Euclid, Book II. — Practise Needlework	Drawing *or* Revision	Science *or* Revision
WEDNESDAY	Theory of Measures and Multiples	Paraphrasing (see Article)	Drawing *or* Revision	Music Scales and Signatures of C, D, E, G, Minor, Intervals of Minor Scale *or* Intervals of Minor Scale, Names of Chromatic Notes	Analysis and Parsing	How to teach Writing	Interest and Discount	Tables of the Parts of Speech	How to teach Spelling	Averages and Percentages	Paraphrasing	How to teach Arithmetic
THURSDAY	First Four Rules of Algebra — Ingredients of Food	Write out Notes a Lesson on '*Case*'	Mensuration of Right-angled Triangles — Problems in Vulgar Fractions	Simplifications in Algebra — Preparation of Food	History from 1688 to 1714	Mensuration of Triangles — Problems of Inverse Simple Proportion	Simple Equations — Rules of Health	History from 1714 to 1727	Drawing *or* Revision	Theory of G.C.M. and L.C.M. — The Food Needs of the Body	Drawing *or* Revision	Stocks
FRIDAY	Deductions on Euclid, Book II. — Calico Sampler	Physical Geography of United States	Music $\frac{2}{8}\frac{4}{8}\frac{3}{8}\frac{6}{8}$ Time Various Forms of the Minor Scale *or* Quarter Pulse Notes and Notes Thirds of a Pulse. The Minor Scale	Props. 1 to 10 Euclid, Book I. — Flannel Sampler	Physical Geography of Mexico and Central America	Prefixes and Repetition	Props. 10 to 20 of Euclid, Book I. — Diagram of Chemise on Sectional Paper	Phenomena of the Earth's Motions	Affixes and Roots	Deductions on Euclid, Book I. — Calico Sampler	Physical Geography of Australia	Repetition, Literature, and Penmanship
SATURDAY	Drawing *or* Revision	Science *or* Revision	Examination	Drawing *or* Revision	Science *or* Revision	Examination	Latin *or* French Grammar	English Composition	Examination	Language — English, Latin *or* French	Science *or* Revision	Examination

2. Point out the difference in meaning between the words in each of the following pairs; and put each word into a sentence of your own construction :—

Reverend } *Permissive* } *False* } *Benevolent* } *Apathy* }
Reverent } *Permissible* } *Fallacious* } *Beneficent* } *Antipathy* }
Distinct. }
Dissimilar. }

3. Describe the situation, and account for the rapid growth in modern times of seven of the following places :—*Crewe, Swindon, Barrow-in-Furness, Middlesborough, Bournemouth, Blackpool, Brindisi, Port Said, San Francisco, Winnipeg.*

4. Where are *Khartoum, Herat, Munich, Washington, Saragossa, Sedan, Utrecht, and Delhi?* Give a short description of one of these places.

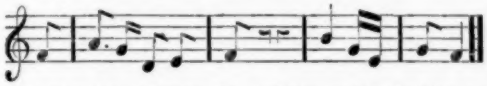
5. What Acts have been passed at various times against Romanists and Nonconformists, and when and in what circumstances have they been repealed?

6. Mention a marriage between (*a*) a Tudor and a Stuart; (*b*) Tudors or Stuarts and continental families. Show the historical importance of the cited marriages.

7. Give a short list of the different kinds of books which you would expect ordinary boys and girls to be able to read by themselves immediately after quitting the day-school, say at the age of 13. Mention some good books which you think are rather too difficult for such children.

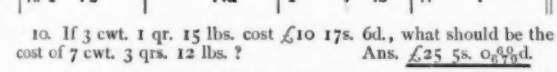
8. In preparing a lesson upon a comparison between the present condition of Great Britain, and that of France, Germany, *or* the United States, state what classes of facts you would wish to procure, and in what books you would seek them. Give an example of a sketch which would exhibit your facts in tabular form on the blackboard.

9. Re-write the following an octave *lower* on the Bass clef, doubling the value of every note and rest :—



OR

Re-write the following, (*a*) doubling, and (*b*) halving, the value of every note and rest :—



10. If 3 cwt. 1 qr. 15 lbs. cost £10 17s. 6d., what should be the cost of 7 cwt. 3 qrs. 12 lbs.? Ans. £25 5s. $0\frac{60}{679}$d.

11. Three men together fill a pit in two hours and a half, throwing in respectively 6, 8, and 9 equal shovelfuls of earth per minute. In what time could each man have filled up the pit by himself?

Ans. 9 hrs. 35 mins.; 7 hrs. $11\frac{1}{3}$ mins.; 6 hrs. $23\frac{1}{3}$ mins.

12. (*Men only.*) Write out Euclid II. 5.

P is a point between two given parallel straight lines, such that any two straight lines drawn through P always intercept equal portions of the parallel straight lines. Show that P is equidistant from the parallels.

(*Women only.*) What is meant by respiration? Describe the process and the use of it. Say also what common practices interfere with proper respiration, and how such practices may be corrected.

13. (*Men only.*) Reduce to one fraction :—

$$\frac{x+3}{x^2-7x+10}+\frac{x+2}{x^2-8x+15}+\frac{x+5}{x^2-5x+6}.$$

Ans. $\frac{3x^2-38}{(x-2)(x-3)(x-5)}$.

(*Women only.*) Which are the principal cereals, and what are their ingredients? What do you know of the nature and properties of wheat, barley, and rice?

14. (*Men only.*) A man starts on a journey on foot and walks three miles an hour. Two hours later his friend follows him, and rides 7 miles an hour. Where will the latter overtake the former?

Ans. $10\frac{1}{2}$ miles from point of starting.

(*Women only.*) What articles would be required to furnish a cottager's kitchen and bedroom? State cost.

15. (*Men only.*) A horse going round a circus ring 20 feet in diameter was observed to make 13 complete circuits in a minute. Express in miles per hour the rate at which he was moving.

Ans. $9\frac{3}{7}$ miles per hour.

(*Women only.*) Give directions for cutting out a child's pinafore. State the dimensions and the different materials required for making it.

16. Draw up an analysis of the 'Sermon on the Mount.'

17. Give scripture proofs of Our Lord's judicial office, The Forgiveness of Sins, Original Sin, and, The duty of religious Self-examination.

TEACHING NOTES ON 'THE LIFE AND DUTIES OF THE CITIZEN.'

By the authors of 'Hughes's Constitutional Reader: a Series of Lessons on the Life and Duties of the Citizen.' (Published by Joseph Hughes & Co., Froebel House, St. Andrew's Hill, Doctors' Commons, E.C.)

LESSON VIII.—Central Government.

I. Explanation.

Government of England constitutional (*con*, together; *stare*, to stand), consisting of Monarch, House of Lords, House of Commons. Hence called *limited* monarchy.

II. Chief Kinds of Government.

1. *Monarchy* (*monos*, one; *archōn*, ruler).—One person as representative head under title, King (Queen), Emperor (Empress), Kaiser, Czar, Shah, Prince, Duke. (*a*) Limited, (*b*) Unlimited, or Despotic.

2. *Oligarchy* (*oligoi*, few).—More common in ancient times.

3. *Republic.*—Government by the people themselves; president elected by people. (France, United States.)

4. *Anarchy* (*an*, not) denotes an absence of any recognised form of government.

III. The Monarch.

Victoria, daughter of Edward, Duke of Kent, fourth son of George III., belongs to House of Hanover. Full title: 'Victoria, by the Grace of God, Queen of the United Kingdom of Great Britain and Ireland, Defender of the Faith, Empress of India.' (A short sketch of present Royal Family might be given by teacher.)

IV. The House of Lords.

About 540 members (not fixed), representing generally the wealth and landed interest of the country. Promotion to Upper House granted by sovereign to men who have performed valuable services in cause of science, literature, politics, or art. Composed of (1) Princes of royal blood, (2) Dukes, (3) Marquises, (4) Earls, (5) Viscounts, (6) Barons, (all hereditary), (7) Spiritual Peers (Bishops and Archbishops), (8) Scottish Representative Peers (elected for each Parliament), (9) Irish Representative Peers (elected for life).

V. The House of Commons.

670 members. England, 461, Scotland, 72, Wales, 34, Ireland, 103.

1. *Constitution.*—Elected by people possessing franchise; four different kinds of constituencies—cities, boroughs, counties, universities; first three in most cases subdivided; constituencies, generally speaking, single membered, but a few double.

2. *Franchise* possessed by men only: (*a*) owners of land (freehold, £2 annual value), (leasehold, £5 annual value); (*b*) ratepayers; (*c*) lodgers above

£10 per annum; (*d*) those living in houses or rooms provided by employer (service franchise). Names of voters in each constituency prepared each year by overseers; claims tested, if objection raised, before revising barrister at time and place previously announced. (Register.)

3. *Qualification of Candidate.*—Any man over 21, except member of House of Lords, priest of Established Church or Roman Catholic Church, an unnaturalised alien, a lunatic or idiot, a judge, a person convicted of treason or felony, or bankrupt.

4. *Period for which Elected.*—Duration of Parliament, which cannot exceed seven years. When fresh Parliament elected, after previous Parliament has been dissolved, a *General Election* is held. Seat can only be vacated by death, or by accepting nominal office of profit under the Crown, the chief of which is the Stewardship of Chiltern Hundreds, after which *bye-election* takes place for that particular constituency. Acceptation of any office of profit under the Crown must be accompanied by resignation of member, but in most cases retiring member eligible for re-election. Time in each year during which Parliament is sitting described as *session* (Lat. *sessum*, to sit). At end of each session Parliament *prorogued* by sovereign in person, or commission representing sovereign.

Read 'C.R.,' Chapters 11 and 12.

LESSON IX.—Party Government.

I. Political Parties.

Government by party long existed in England. In time of Commonwealth, Cavaliers, or Court party, opposed by Roundheads; about the year 1680 Tory and Whig; at present day Conservatives and Liberals (Radicals).

II. Choosing a Member of the House of Commons.

1. *Writ.*—Notice issued by Lord Chancellor (General Election), or Speaker (Bye-election), to Returning Officer (Sheriff of county, Mayor of municipal borough), giving him authority to hold an election.

2. *Nomination.*—Each candidate nominated by two qualified electors of the district, and eight assentors. If more than required number of candidates nominated, an election follows.

3. *Election.*—By ballot. Constituency divided into polling districts, and poll opened from 8 a.m. to 8 p.m. Ballot boxes then sealed and carried to town hall or other central place, votes counted, and result announced. Great pains have been taken to secure purity of election. Each candidate appoints election agent, through whose hands all bills must pass. Amount spent by candidate limited by Act of Parliament. Charges of corrupt practices tried by judges, and, if proved, election declared void, or seat given to opposite party; if on extensive scale, constituency disfranchised during sitting of that Parliament.

Expense of election borne by candidates.

III. The Ministry.

After General Election, leader of party having largest number of representatives returned, called upon by Sovereign to form a ministry. For this purpose he has to choose some fifty men to undertake different government offices. From these a sort of committee formed, called the Cabinet.

1. *The Cabinet.*—Consists of about sixteen most important members of ministry: Prime Minister (Premier), Lord Chancellor, Chancellor of Exchequer, Lord President of Council, Lord Privy Seal, Secretaries for War, India, Colonies, Home Department, Foreign Affairs, Presidents of Local Government Board, Board of Trade, Postmaster-General, Chief Secretaries for Ireland and Scotland, Vice-President of Council, First Lord of the Admiralty, Chancellor of the Duchy of Lancaster. (Work of these will be dealt with in subsequent lessons.)

2. *Work of Cabinet.*—To prepare government measures, to deliberate upon, and carry into execution, government matters generally, to control and arrange the work of Parliament. All members of Cabinet are *ex-officio* Privy Councillors, and are styled Right Honorable. Deliberations of Cabinet secret; Sovereign kept constantly informed of what takes place.

IV. Use and Abuse of Party Government.

1. *Uses.*—(1) Policy of government subjected to severest criticism by opposition; (2) effective means of educating the electorate by presenting each side of questions of policy; (3) power of directing action of government placed in hands of people.

2. *Abuse.*—Preferring party interest to that of country. Party politics can only be justified when used as a means of securing the good government of the country generally.

(This subject is more fully dealt with in Chapters 13 and 14 of 'C.R.')

LESSON X.—The Making of Laws.

I. Introduction.

Before proceeding with this lesson, the teacher will explain that each house is presided over by a chairman (Speaker in the Commons, Lord Chancellor in Lords); that supporters of government sit to right of chairman, and opposition to left; that front benches on each side occupied by Cabinet and ex-Cabinet ministers respectively, and that there are lobbies for taking divisions.

II. A Bill.

Name given to proposed law. Two kinds, (1) Public, (2) Private; the former introduced by government or private member dealing with public question; latter by company, corporation, etc., seeking for special powers (making railways, canals, etc.). A public bill introduced by Government called a government measure. Before becoming law, bill must be approved by Commons, Lords, and Sovereign.

1. *A Bill in the Commons.*—Three stages, or readings. *First* reading, leave given to bring in bill, after which it is circulated among members; *second* reading, objects of bill examined and debated upon, after which it is dealt with, clause by clause, in committee (generally of the whole House, but sometimes by select committee chosen from the whole House). While this committee stage is being passed, the Speaker's place is taken by the Chairman of Committees. After passing through committee, the bill is reported to the House, with the Speaker in the chair, after which it has to pass its *third* reading. This being done, the bill is sent to the House of Lords.

2. *A Bill in the Lords.*—The same process as in the Commons, except that permission to introduce a bill is not needed as in the Commons.

3. *A Bill before the Sovereign.*—Having passed the two Houses, the bill only requires the Sovereign's consent before it becomes law. This is invariably given, the Queen's consent being announced by a Commission.

III. Addenda.

1. A private bill must pass through the same stages as those described above; but generally the first and second stages are passed *pro formâ*, and a small committee is appointed to consider it, examine witnesses, and report its decision to the House.

2. Sometimes a bill passes the Lords before the Commons, but the order given above is generally followed with all important bills.

3. Money bills—that is bills dealing with questions of taxation and revenue—are never originated in the Upper House, but are passed by them without discussion.

4. Amendments made by the Lords must be reconsidered by the Commons, and if the two Houses cannot agree, the bill must be abandoned.

5. A debate may be 'closured' if a motion to that effect is carried by a majority of the House, after being proposed by one of the members, and approved by the Chairman.

6. Royal commissions are from time to time appointed by the government (nominally the Crown) to consider certain questions, and the advisability of legislating on certain lines. Such commissions are not formed exclusively of members of the two Houses of Parliament.

7. Provisional orders are granted by public departments to private persons and public bodies, to carry out works of public usefulness. They must receive the assent of Parliament, and may be appealed against by any person likely to be injuriously affected by them. If opposed, however, they are dealt with as private bills. The object of such orders is to save expense and labour in obtaining powers likely to meet with little or no opposition.

Read 'C.R.,' Chapters 15 and 16.

LESSON XI.—The Judicial System.

I. Administration of the Law.

1. *Lord Chancellor* appointed by Premier when forming ministry. Socially highest layman in the land. Head of all law departments. Generally Chairman of House of Lords.

2. *The Judges* appointed for life by Lord Chancellor in name of Sovereign (Lord Chief Justice by Premier); only removable on address of both Houses of Parliament to Sovereign (a very rare occurrence).

3. *County Court Judges* appointed by Lord Chancellor from barristers of at least seven years' standing, removable for inability, or neglect of duty.

4. *Magistrates.*

(*a*) *Borough.*

(1) *Recorder* for borough of quarter sessions, appointed generally by Sovereign through Lord Chancellor.

(2) *Stipendiary* (paid), in largest towns and places where much work entailed, appointed by Home Secretary.

(3) *Ordinary Borough Magistrates* (unpaid), including Mayor and ex-Mayor, appointed by Lord Chancellor. (These do not interfere where there are stipendiaries)

(*b*) *County.*—Appointed by Lord Chancellor on nomination of Lord Lieutenant of County.

5. *Coroners.*

(*a*) *Borough.*—Appointed by Town Council.

(*b*) *County.*—Appointed by County Council and magistrates at quarter sessions.

They investigate (but do not adjudicate upon) all cases of suspicious death, sudden death where medical certificate not forthcoming, deaths occurring in prison, also finding of treasure-trove. Assisted by jury. If verdict of murder or manslaughter, the evidence handed to magistrate, and witnesses bound over to appear.

II. Juries.

Trial by jury, in which body of men called upon under an oath (*juro*, I swear) to hear evidence, and pass their opinion, or verdict; long existed in England. Three kinds, Grand, Special, Common.

Jury lists made out each year by overseers, and publicly exhibited.

Juries selected by Sheriff or Under-Sheriff.

1. *Grand Juries.*—Not less than twelve, or more than twenty-three. Men holding high social position, generally county magistrates. Attend at quarter sessions or assizes, and examine in private evidence to be brought forward, and decide whether case to be tried or not: former case, a 'true bill' returned; latter case, 'no true bill,' and prisoner acquitted. Verdict must be agreed upon by at least twelve jurors.

2. *Special Juries.*—Twelve men of good social position or rating qualification, to try civil cases. They generally assess damages where such are claimed, and are paid for their services.

3. *Common Juries.*—Twelve men to investigate cases before coroner, or criminal cases at quarter sessions or assizes after 'true bill' returned. Verdict must be unanimous.

III. Criminal Courts.

Courts where crimes inquired into, and culprits duly punished.

1. *Preliminary*, before magistrate. All cases of crime investigated, but only lighter kinds of offences adjudicated upon; more serious to courts of summary jurisdiction; most serious to quarter sessions or assizes.

2. *Courts of Summary Jurisdiction.*

(*a*) *Petty Sessions.*—Two justices, or more.

(*b*) Court of stipendiary magistrate.

Cases tried without jury, counsel may be employed. Appeal sometimes allowed to quarter sessions or Queen's Bench.

3. *Quarter Sessions.*—Consist of county magistrates, presided over by chairman, chosen by themselves. Four times a year.

4. *Assizes* held by judge from time to time 'on circuit.' Judge met by Sheriff, and visit attended with much formality, out of respect for law.

5. *Appeal.*—No distinct court of criminal appeal. Court of Queen's Bench (of which the assize court is constituted one) exercises general jurisdiction. Final appeal in all cases rests with Home Secretary.

IV. Civil Courts.

For settling grievances between subject and subject.

1. *County Courts.*—About 500 county court districts, and judge appointed for each district. Simplest

kinds of civil cases, debts (under £50), etc. Counsel may be employed, and jury, but this not generally the case. Appeal in certain cases to higher court. Also used as Court of Bankruptcy. (In all civil cases the person who takes the action called the plaintiff, the one against whom action taken, defendant.)

2. *High Court of Justice.*—More serious cases in civil court at assizes, or Law Courts in London. Four divisions.

(*a*) *Chancery Division* (Lord Chancellor and five judges).—Court of Equity. Cases of private wrong, not so much matters of statute law, as of reason and natural right..

(*b*) *Court of Queen's Bench* (Lord Chief Justice, and about thirteen judges).—Most important of all. Libel, unjust dismissal, damages for injuries received, and all other cases not under cognisance of other courts.

(*c*) *Probate, Divorce, and Admiralty* (President and a judge).—Wills, marriages, offences on the high seas.

(*d*) *Court of Arches* (one judge).—Ecclesiastical cases.

3. *Higher Courts* (without jury).

(*a*) *Court of Appeal.*—Judges specially appointed to hear cases tried in Courts of Queen's Bench or Chancery.

(*b*) *Judicial Committee of Privy Council.*—Privy councillors learned in law, to whom are referred cases tried in Probate, Divorce, and Admiralty Court, or Court of Arches. Also cases tried in colonies.

(*c*) *House of Lords.*—Final court of appeal. Formed of law lords, *i.e.*, those members who hold, or have held, high judicial office.

V. Absolute Justice is assured by the following considerations :—

1. In eyes of law all men are equal.

2. By writ of *habeas corpus* (thou mayest have the body), a person under detention may claim to be at once brought before the High Court to have the validity of his detention examined.

3. By jury system, each person tried by fellow men, 'honest and true.' Right to challenge a juryman.

4. Any doubt given in prisoner's favour.

5. Courts of Appeal render failure almost impossible.

6. Change of venue (place of trial) may be obtained if people of certain locality likely to be unjustly influenced.

7. Counsel, consisting of solicitors and barristers, experienced in the law, employed to conduct case for each side.

'C.R.,' Chapter 17.

WELL-KNOWN TEACHERS AT WORK.

XXVI.—MR. E. B. LETHBRIDGE, F.R.G.S.,

Head Master of the Higher Grade School, Brighton.

Many and varied are the soul-stirring adventures which have, ere now, befallen that product of latter-day civilization—the professional interviewer—in the pursuit (legitimate or otherwise) of his avocation. It is therefore with abashed front and full consciousness of demerit that we confess to a reception by the subject of the present sketch which did not result in anything worse than courtesy and benignity, friendliness and hospitality, elevating discourse and overbrimming sympathy experienced alike at home and at school, and during a blood-circulating constitutional over Brighton's breezy Downs.

To find the Brighton Higher Grade School is a problem (like a Chinese puzzle) of some little difficulty, as it is hidden away in a somewhat perplexing manner. Once inside the walls, however, we were ushered into the sanctum of the genius of the place. Here we encountered our first surprise in the form of a *clerical assistant*, who, deeply versed in the occult arts of shorthand and type-writing, makes it possible for Mr. Lethbridge to devote his energies to supervision and teaching, notwithstanding the heavy returns which are so frequently to be prepared. This much-to-be-desired innovation is a tribute to the wisdom of Mr. Lethbridge and to the far-sightedness of the Brighton Board. We may as well at once record that our progress round the school, and the accompanying deepening insight into the working thereof, only increased our sense of these two facts. Rarely, if ever, have we seen any approximation to the completeness and perfection, both in *ensemble* and in detail of the organisation, which are evident on all sides in the management of this school. That Mr. Lethbridge has the bump of organization developed to an extraordinary degree is our firm conviction, else how could he have worked out such an elaborate and withal simple system of governing his school and recording the progress of each individual scholar in each separate subject?

The school is in reality duplex: one section, the Elementary Department, including Standards IV.—VII., being taught on one floor; another, the Organised Science School, under the Science and Art Department, being housed a story higher. One result of this duple character is a double system of registration and two distinct staffs. Although not the first, York Place was one of the earliest Higher Grade Schools, and much pioneer work has fallen to the lot of the Brighton School Board and its able clerk, Mr. Carden, as well as to Mr. Lethbridge, especially on the financial side; but our 'victim' is nothing if not a fighter, and the present position of master and school speaks volumes for the pluck and pertinacity, coupled with an intelligent appreciation of what was needed, of the teacher, who certainly has not come off second best.

That the school has had many friends goes without saying, and foremost amongst these stands Mr. D. Hack, J.P., who contributes no less a sum than £200 per annum towards the provision of scholarships, with which the school is somewhat bountifully provided. But the great factor in the achievement of the success is, without doubt, the personality of the Head Master. To affirm otherwise would be idle. In every direction to which the development of education tends, we found that York Place had anticipated progress, and in no particular is this more apparent than in the foundation of school institutions, a list of which is herewith appended :—

1. Library, and Natural History Library.

2. An admirably arranged Museum, with unusual wealth of specimens arranged in an ingeniously get-at-able style.

3. Recreation Society, founded in 1885, comprising :—

(*a*) Cricket Club (3 elevens).
(*b*) Football Club (2 elevens).
(*c*) Swimming Club (Baths thrice a week from September to May. Sea for remainder of the year).
(*d*) Literary and Chess Club, provided with the best obtainable boys' literature. Chess is played in the interval between morning and afternoon school, and on Recreation Evenings.
(*e*) Natural History Club, with meetings and discussions in the winter, and rambles for the summer.
(*f*) Musical Club.
(*g*) Cycling Club.
(*h*) Old Boys' Club.

We have before us the programme which was followed on the occasion of the Annual Excursion of the Recreation Society, the venue being Arundel, and the date July 18th, 1893 :—

9.30.—Assemble at the school.
11.20.—Arrive Arundel. Go direct to the Castle and Park and ascend Hiorne Tower.
12.30.—Lunch at Hiorne Tower and walk across park to Southwoods.
4.30.—Tea.
6.0.—Leave Southwoods by boat.
9.42.—Leave Arundel Station.
10.26.—Arrive Brighton.

As to the Swimming Club, at the Annual Display of the Brighton Swimming Club two of the chief events were under the names of the members of the York Place Club. Not to be behindhand, the Football Club sends me a programme of the most diverting and truly musical concert, in which no small part is played by the admirable school choir.

In no school have we seen such care exhibited with regard to keeping parents well informed as to the curriculum of the school, and as to the progress of the children. This is most conspicuously apparent in the elaborate Annual Report which is circulated amongst parents and friends of the school. This, however, is too voluminous to be inserted; we give, in illustration of the above contention, (1) form of admission; (2) register of marks and progress, and (3), report on Scholarship Holders.

BRIGHTON AND PRESTON SCHOOL BOARD (U.D.).
HIGHER GRADE BOARD SCHOOL,
York Place, Brighton.
(For Standards IV. and upwards.)

BOYS' DEPARTMENT.
Head-Master :—Mr. E. B. Lethbridge, F.R.G.S.

SUBJECTS TAUGHT.

Scripture.	History.
Reading.	Mathematics.
Writing.	Mechanics.
Composition.	Animal Physiology.
Arithmetic.	Drawing.
Grammar.	Singing.
Literature.	French.
Geography.	Manual Instruction.

The school is recognised by the Science and Art Department, South Kensington, as an Organized Science School and Art School, and Scholars above the Sixth Standard will be taught one or more of the following subjects :—

Chemisty (theoretical, practical); sound, light, and heat; practical plane and solid geometry; magnetism and electricity. And the following technical subjects :—Wood-working, modelling in clay, and wood carving, also Latin, shorthand, and book-keeping.

Terms :—

In all standards, 6d. per week. All fees must be paid in advance. Scholars are admitted on Mondays from 9 to 10 a.m.

Child's rotation number.....

Please keep this half of the form.

RULES.

1.—No Scholar is admitted unless he has passed the Third Standard of the Government Code, or is able to pass an equally difficult examination.
2.—Scholars must assemble at the School every week-day morning punctually at a quarter before nine, and every afternoon at a quarter before two, except Saturday, which is a holiday.
3.—No Scholar is permitted to remain in School if he comes after the Registers have been called, nor is any Scholar who has been marked present allowed to leave before the time for closing the School.
4.—No child may stay away from School without leave from the Master. Leave of absence will be granted on application either personally or by note, but such application should be made before, and not after the child absents himself.
4A.—The Registers are carefully examined every quarter, and scholars who are found to have been irregular in their attendances will be degraded to a lower class, in order that they may not retard the progress of those who are rarely if ever absent.
5.—Every boy must be provided with all necessary books and materials, which can be purchased at the Schools.
6.—Scholars leaving their clothes, books, or school materials, in the class room or playground do so at their own risk. The Managers cannot be responsible for any loss.
7.—Scholars are dismissed at 12.30 and 4.30, unless detained for purposes of discipline.
8.—Prizes and Certificates will be given to all who attend regularly and pass the Annual Examination held by Her Majesty's Inspector.

A Quarterly Report of Attendance, Progress, and Conduct is sent to every Parent.

A Penny Bank is established in connection with the School, also a Lending Library for the free use of all Pupils who attend regularly.

Dinners may be purchased at the School at a small cost.

Note.—The Head Master will be present to receive Parents on Mondays and Thursdays from 12.0 to 1.0 p.m. He cannot undertake to see them at any other time. Parents are also invited to see the School at work on Thursdays, from 3 to 5 p.m.

To be filled in at the School.

Rotation No._____ Class_____

Date of Admission_____ Standard_____

PLEASE FILL UP AND RETURN THIS FORM.

Child's Surname_____

,, Christian Name *in full*_____

Date of Birth_____ day of_____ 18____

Place ,, _____

Names of Parents or Guardians_____

Father's Christian Name_____

Mother's Christian Name_____

Father's Occupation_____

Residence_____

Name *in full* of Last School_____

Highest Standard passed (if any)_____

Name of School in which passed_____

BRIGHTON & PRESTON SCHOOL BOARD, U.D.

HIGHER GRADE BOARD SCHOOL, YORK PLACE, BRIGHTON.—BOYS' DEPARTMENT.

ELEMENTARY SECTION.

Class.....
Examination No.....

Report *of the Attendance, Progress, &c., of*.....
in the.....*Class during the Quarter ending*.....189

N.B.—Parents are requested to examine and preserve this Report, and to inform the Head Master if they do not receive one shortly after the close of each Quarter.

ATTENDANCE.	No. of Attendances at School.		
	No. of Absences from School.		
	No. of Red Ink marks.		
PROGRESS.	Religious Instruction.		
	Reading.		
	Writing and Spelling.		
	Arithmetic.		
	Grammar.		
	Composition.		
	Geography.		
	Drawing.		
	Home Lessons.		
	Extra Subject.		
	Extra Subject.		
	Extra Subject.		
	Extra Subject.		
	Extra Subject.		
	TOTAL for Instruction.		
Total Lost	Personal Appearance.	1	Lost Marks, as may be deducted under 1 and 3.
	No. of Times Late.	2	
	Conduct.	3	
	Quarter's Total.		
	No. of Scholars in Standard.		
	Order of Merit this quarter.		
	Order of Merit last quarter.		
REMARKS.	.....*Class Master.*		

A.—Absent during the Examination.
N.E.—Not examined in this subject.

40 is the highest number of Marks obtainable for each subject.

.....*Master.*

Examination No......

.....189

Received the report of .....

For the Quarter ending .....

(Signed).....

TO THE PARENTS.—Please enter any remarks upon this Report on the back of this counterfoil.

BRIGHTON AND PRESTON SCHOOL BOARD, U.D.

Boys' Department,
Higher Grade School,
York Place, Brighton,
February 25th, 1893.

Organised Science School,
No. 4,620.

To the Chairman and Members of the Brighton and Preston School Board.

SIR, MADAM AND GENTLEMEN,

I beg to submit the following report upon the three classes of Scholarships now held in connection with this School :—

Scholarships of the First Class (*Science and Art*).

These Scholarships are tenable for three years, and for the year under report have been held as follows :—

Nine of the Third Year, Value £15 each.—Five of these expired on July 31st, 1892, and the remainder will lapse next July. One of the lads (Charles L. Fisk) was placed in the First Division at the London University Matriculation, and another (George Patchin) has surrendered his Scholarship, having gained the Scholarship offered by the Managers of the Technical School.

Fourteen of the Second Year, Value £12 each.—Three of these have been surrendered, the parents of one lad having left the town, and domestic circumstances necessitating the withdrawal of the others.

Eleven of the First Year, Value £9 each.

Scholarships of the Second Class ('*Hack*'), *value* £5.

Three of these are held in the Boys' Department and will expire in May, but the holders will be eligible to compete for those of the First Class.

Scholarships of the Third Class ('*School Board*').

Tenable for three years :—

Eight of the Third Year.
Fourteen of the Second Year.
Twelve of the First Year.

I cannot speak too highly of the value of these Scholarships to the School. Many of the holders are lads of good ability, and with remarkably few exceptions are trying their best to make good use of the advantages the School is able to offer.

I submit herewith a detailed report of the successes of the respective holders at the Science and Art Examinations, and wish to point out that this does not show their success in Literary, Technical, and Commercial Subjects, in which many of them have done exceedingly good work.

I am, Sir, Madam and Gentlemen,
Your most obedient Servant,
EDWIN B. LETHBRIDGE.

Two special rooms are the Art Room, which is admirably lighted, and the Chemical Laboratory, which is a model of what such a room should be, the arrangements for the disposal of the apparatus and reagents being little short of perfect. One thing which was lacking was a balance-room, the necessity for which will become greater and greater as the number of students taking the Honours, Practical, Organic, or Inorganic course in Chemistry becomes increasingly great. As to the teaching of the various subjects, we can only find space to say that a thorough grasp of pedagogics is instinct in all the methods. Reading is characterised by breadth of treatment, the books read being many-sided and calculated to inspire a love for reading. The writing of the whole school is marked by uniformity, and this is not remarkable when it is noted that the best writer on the staff—and we had ocular proof of his excellence—sets copies for the whole school, to which, indeed, he acts as writing master. In arithmetic special attention is paid to the metric system from the lowest (IV.) standard upwards, a step which is abundantly wise when the scientific nature of a large part of the instruction is remembered. Excellence in science, however, does not render excellence in art impossible. By chance it fell out that the specimens sent to South Kensington to be examined had just been returned at the time of our visit, and we spent an interesting quarter-of-an-hour

in the examination of these admirable proofs of the school's artistic efficiency. Suffice it to say that almost every effort was crowned with departmental success, and Mr. Lethbridge is justly proud of the artistic skill displayed by his pupils. Instruction in modern languages is also made a special feature, and from the French lesson which we saw in progress we should augur well for the success of this branch of the teaching.

Knowing how frequently museums are mere show features of schools, and noting the great number and variety of the specimens enclosed behind the York

Report of Progress, Conduct, etc., of all 'Science and Art' Scholars during Year ended February 28th, 1893.

Year of Tenure.	Donor.	Scholar.	Age.	School previously attended.	Science and Art Subjects passed during Scholarship Year.	No. of Half days' Absence.	Remarks.
Third (expired July 31, 1892.)	D. Hack, Esq.	Fisk, Chas. L.	16	Higher Grade, 5½ years.	Mathematics, 2nd Stage, 1st Class. Theoretical Chemistry, 2nd Stage, 2nd Class. Practical Chemistry, 2nd Stage, 2nd Class. Physiography, 1st Stage, 1st Class. Second Grade Freehand, 1st Class. " " Perspective, 1st Class. Third Grade Outline from Cast, 2nd Class. Third Grade Shading from Model, 2nd Class.	—	A hardworking lad. Passed in the first division of the London University Matriculation. Has also been of great service with the Literary Club of the School.
Third (of present Scholarship year.)	"	Patchin, George	15	Higher Grade, 5 years.	Plane and Solid Geometry, Sec. I. passed. Mathematics, 2nd Stage, 1st Class. Theoretical Chemistry, 2nd Stage, 2nd Class. Physiography, 1st Stage, 1st Class. Second Grade Freehand, 1st Class. " " Model, 1st Class. " " Perspective, 1st Class. " " Modelling in Clay, 1st Class. Third Grade Shading from Model, 1st Class. Third Grade Shading from Cast, 1st Class.	—	General character excellent in all respects.

In all 35 Scholarship-holders are reported upon: the above two are simply given as specimens of the rest.

Place cases, we ventured to put the efficiency of our friend's exhibits to the test. Usurping for the nonce the position of a class master in the school, we successively demanded, in illustration of a supposititious lesson, specimens in the animal, vegetable, and mineral kingdoms. With the utmost celerity, hey presto! and there were the specimens. We could no longer doubt that practical utility was subserved by the York Place museum, and we soon saw through the simple device by which this result was arrived at. Each teacher has a general catalogue which gives him a clue to the *case* in which the desired specimen is deposited. Attached to this case is a monitor, with a detailed catalogue, indicating to a nicety the *exact position* in which the desideratum reposes. The monitor is sent for, the case is indicated, and *voilà l'affaire c'est fini*, as the French have it.

Many other indications of the *nous* of the master were patent to us during our short visit. He believes, for example, in up-to-date educational literature, and many choice specimens of this did we see when later on we called at Warlegh Road, the residence of the interviewed, who is a first-rate French and German scholar. By forming a kind of literary society every teacher is enabled to see each and every educational periodical for about the same price as it would cost the said teacher to enjoy his PRACTICAL TEACHER in isolation; furthermore, the master goes well into the articles with an eye to the good they may do for York Place, and, if anything strikes him, he forthwith sends round a note to the master or masters most concerned, advising them to give particular attention to such-and-such a portion of such-and-such a periodical. On the technical side progress is equally evident. The cricket pavilion in the Dyke Road was constructed by the boys, and it is a unique structure, as it exhibits all the various kinds of joints that the boys had learned, under Mr. Judd's able tuition, to construct. A complete set of wood-carving, which had been prepared for exhibition in a local exposition, struck us as being remarkably good. Here the relation between drawing, modelling, and carving is rigidly adhered to, and how to develop faculty is the prevailing idea, not how to make carpenters. In this department of school work Mr. Hack's generosity again confronted one, for not only was it due to him that a complete set of lathes was available, but working models of marine engines, and other mechanical contrivances constructed in wood, were to be seen. We noted also that plant was laid down for the production of the electric light, with which the technical department is on occasions illuminated; although not strictly a part of the school, the technical department, which, as aforesaid, is under the able direction of Mr. Judd, is, by arrangement, closely connected with it.

And so one might continue almost indefinitely in the enumeration of the thousand and one features which indicate how far-reaching and thorough is the organisation of this excellent school; but other matters press for notice, and to them we turn our attention.

The building in which the school is now located is inadequate for the purpose for which it was intended, and hard by another building is in course of construction, which will be a model of what a *fin-de-siècle* Higher Grade School should be, for the Brighton Board has had the wit to utilise the knowledge and ability of Mr. Lethbridge, in the details of plans for the new building. Upon this subject of school building and equipment the head master held forth eloquently. 'A few years since,' quotha, 'I visited schools in France, Belgium, Germany, and Austria, as far as Vienna. I had, just previously, seen schools in most of our large towns, and was struck with the great superiority of the foreign buildings, for nowhere in England had I seen such elementary schools, as for example, the new Volkschulen of Leipzig and Berlin. Last year I was again visiting Manchester, Bolton, Halifax, Leeds, Leicester, and Birmingham, and I feel proud that we have now as good buildings as can be found anywhere.

'Our own new Brighton School will bear comparison with a good many of the best, and the Higher Grade Boys' School, which is now being built to accommodate 760 boys, will, I hope, be well worth the £17,000 which is to be spent upon it.' To which we fervently ejaculated a sincere Amen!

As will be seen from the Conference of Higher Grade Teachers, Mr. Lethbridge is in favour of admitting children to the Higher Grade School before they have attained the Fourth Standard. The new school is to include those of Standard II. and upwards.

With respect to the abolition of the Second Class Elementary Certificate, Mr. Lethbridge finds himself in direct opposition to the Science and Art Department, notwithstanding the fact that his grant under the new condition is enhanced rather than diminished. 'Hitherto,' says he, 'a large number of deserving students had some evidence of success in the Second Class Certificates, and these were gratifying alike to parents and to pupils. In my opinion there should be an increased Capitation Grant and a smaller grant upon the examination results; in addition, it seems to me that, in order to give stability to organised Science Schools as at present constituted, the Science and Art Department must either (1) give grants for a more elementary instruction than that at present required for a pass in the first stage, or (2) compel the County Councils to liberally subsidise the schools. If neither of these courses can be followed, then must the Education Department grant further liberty for the retention of scholars after they have passed the Seventh Standard, and pay well for the efficient instruction of them'—an opinion with which, we make bold to assure our host, very few will feel impelled to quarrel. As to the Continuation School, Mr. Lethbridge—who has had vast experience in overlooking and organising Evening Schools, and who would have put his hand again to the plough this year had not his Board wisely compelled him to seek first his health and then the educational welfare of Brighton—expressed the following belief: 'It will be a great boon to those who are desirous of improving their education, but not for a moment must it be considered equivalent to two or three years in regular attendance at a well-organised Science or Commercial School.'

Glancing an eye of concern upon the present chaotic condition of English Secondary Education, and then passing to the organic unity to be met with abroad between the various grades of instruction, it is not to be wondered that, Matthew Arnold-like, our host should sigh for the time when chaos would yield place to a well-considered order. With the *verve* of the skilled organiser, Mr. Lethbridge thus delivered himself: 'It amazes me that England should so long delay the adoption of one comprehensive local school administration such as exists in every country having an educational system worthy of the name. In every German town or city the whole of the schools are under one governing body, and that body is directly affiliated with the University of its State or Province, and practically the same state of affairs holds in France.' We reminded Mr. Lethbridge that England is the happy hunting ground of anomalies of all sorts and conditions, which, judging from the sickly smile thereby evoked, did not seem to give much consolation.

That the Brighton School Board should hold Mr. Lethbridge in high esteem is right and fitting, when his record is taken into consideration. Born in the year 1848, our subject became a Pupil Teacher at the Tor National School, Torquay, wherein Mr. W. J. Pope, Ex-President of the N.U.T. and M.B.T.A., served in a similar capacity. Subsequently he passed to be a student at Exeter Training College. Upon leaving college he became an Assistant-Master in the Brighton Central Schools. After nearly two years' service he was appointed Head Master of the Hanover Terrace Board School, one of the first schools built by the Brighton School Board. In 1880 he was transfered to the newly-built Preston Road Schools, and finally, in 1884, opened his present school, so that he has just completed his second decade in the service of the Brighton Board. To the best of his belief Mr. Lethbridge was the first to commence Science Teaching in Brighton, under the auspices of the Science and Art Department, beginning in 1872 and continuing uninterruptedly to the present time. Of course, such a prominent Teacher is an ardent and enthusiastic Unionist, having been a Member of the Committee of the Local Association nearly the whole of the time that he has been in Brighton. He was President and Chairman of the Conference Committee when, in 1880, Brighton was the rendezvous of the important gathering. He has been Secretary of the Sussex District Union, and from 1876 to 1884 was a Member of the Executive of the N.U.T., being Chairman (in accordance with the eternal fitness of things) of the Organization Committee.

From our own knowledge of Brighton local affairs, we can bear testimony to the high esteem in which Mr. Lethbridge is held, both as a teacher, and better still, as a man. Of him it may be said with truth,

that he has worthily done his part towards the betterment alike of education and of the teacher's position.

It is needless to say that Mr. Lethbridge is supported by a very able staff, both in Science and Art and Standard work, of whom he feels very proud and whose loyal and efficient service he most gladly acknowledges.

The late second master, Mr. C. Lloyd, after nearly nine years very faithful and efficient service has been appointed head master of a splendid new school under the Brighton Board.

Taking leave of our host, we hie our way homewards, well pleased with our labours, which we trust may be equally palatable to the readers of the PRACTICAL TEACHER.

Yours truly
E. B. Lethbridge

CIRCULAR TO H.M. INSPECTORS.

Instruction of Pupil Teachers (Art. 34).

Education Department,
Whitehall, London, S.W.,
6th January, 1894.

SIR,—My Lords have observed with regret that a large number of Pupil Teachers fail to obtain a place in the Class List for the Queen's Scholarship or are placed too low to be qualified for entrance into a Training College. They have reason to believe that this low standard of attainments proceeds in many cases from the neglect of School Managers to see that their Pupil Teachers are carefully and regularly taught.

The following regulations have been laid down by Their Lordships for the future guidance of School Managers, and any serious disregard of them, after due warning, may lead to the disqualification of the School as a place of proper training for Pupil Teachers (*see* Article 34 of the Code). The regulations do not apply to cases where the Pupil Teachers attend efficiently conducted Central Classes.

(1.) The hours in which instruction is given should be entered on a Time Table, and the Managers should ascertain by a personal visit, at least once a quarter, that the hours are properly observed, and should record their visits in the Log Book, or other book kept for the purpose.

(2.) The time should not be spent in private reading, but in actual instruction by the Teacher.

(3.) As a rule the instruction should not be given between the morning and afternoon meetings of the School except for a short part of the winter season, neither should it be given immediately after the afternoon meeting except under very special circumstances. A reasonable interval of time should be allowed between the afternoon meeting and the instruction in all cases where it is given in the latter part of the day.

(4.) The Managers should provide good reference books and text books for the use of the Pupil Teacher, such books to remain the property of the School, and to be approved by the Inspector at his annual visit.

(5.) Note books and exercise books used by the Pupil Teacher should be shown to the Inspector at his annual visit. All exercises and notes should be dated by the Pupil Teacher when they are written, and dated by the Teacher when corrected.

(6.) A book should be kept for the purpose of recording the Pupil Teacher's progress in skill in the conduct and teaching of his class. Short notes of lessons on one of the subjects prescribed by the Code for Pupil Teachers' practice in teaching should be drawn up weekly in the first two years of apprenticeship, and in the last two years full notes of lessons should be prepared weekly in one subject and the lesson should be delivered in the presence of the Principal Teacher. A report on such notes and on the delivery of these lessons in the last two years should be made weekly in this book.

(7.) Quarterly examinations should be held by the Teacher or some other qualified person in each subject of the Pupil Teacher's course for the year, and the worked papers, after being marked by the Teacher, should be submitted to the Managers with a short report upon them, and subsequently produced to the Inspector at his annual visit.

I have the honour to be, Sir,
your obedient servant,
G. W. KEKEWICH.

To H. M. Inspector of Schools.

CIRCULAR TO H.M. INSPECTORS.

Instruction of Lower Standards in Schools for Older Scholars.

Education Department,
Whitehall, London, S.W.,
6th January, 1894.

SIR,—A general opinion was expressed by the Chief Inspectors at their last Conference that the condition of the lower part of many of the schools for older scholars is at present the weakest point of the instruction in public elementary schools.

In the best infant schools children are taught by natural methods, and are trained to use their powers of observation and reasoning; in schools for older scholars they are too often taught by arbitrary and conventional methods, and there is little in the general course of instruction to lead them to observe or to reason. Object lessons are in many cases discontinued, the reading lessons are encumbered with the teaching of spelling even in the First Standard, and hand and eye occupations are very rarely found. Arithmetic also often becomes a mere abstract or mechanical exercise, and is not made to rest upon simple questions of common life within the knowledge and observation of the scholars, nor is it always sufficiently an exercise in reasoning.

When the general character of the lesson presents so little opportunity for the cultivation of intelligence, it cannot be expected that the habit of a spontaneous desire to question which ought to be fostered in young scholars will arise; and it is to be feared that, when examined, they often reproduce knowledge which has been conveyed by methods which are not truly educational.

It should be borne in mind that object lessons cannot be dispensed with if habits of observation are to be duly fostered, and they should be treated as a means for mental exercise and not merely as opportunities for imparting miscellaneous information. Objects should always be present, and in sufficient numbers; and the chief aim should be to call into activity observation and the construction of clear mental pictures, so that the intelligence of the pupils may

be exercised and developed. Geography, where it is a class subject, should be treated in a similar way, and should be taught by visible illustrations and by actual modelling in sand and clay, for the production of miniature rivers, mountains, &c. Tales from History also, if graphically told and well illustrated by striking pictures of sufficient size, will be very helpful in the same direction. Elementary Science (the schemes for which as given in Schedule II. of the Code prescribe object lessons solely for the First and Second Standards) is obviously an excellent class subject from this point of view.

But, whatever may be the method followed, some system of lessons should be arranged in every school by which an intelligent habit of observation and simple reasoning may be fostered, while it cannot be too clearly pointed out that all the subjects simultaneously dealt with in a curriculum should be kept as closely interconnected and made as mutually helpful as possible, and not be unduly isolated and specialized.

So also as regards hand and eye training, it is much to be regretted that the ingenious and progressive Kindergarten exercises for training scholars in deftness of hand and correctness of eye should be almost entirely discontinued after children leave the infant school; and the more so when it is remembered that the mind itself is most effectively trained by such exercises, whenever they are the expression of the children's own thought.

Drawing with coloured chalks, modelling in clay, embroidery of outlines, formation of geometrical patterns and models, and building with cubes, &c., have been tried with excellent results and at very small cost, as convenient methods of continuing the instruction given in the infant school.

You will be careful to explain to managers how very interesting, inexpensive, and educational all these methods are.

As regards the elementary subjects, Spelling, unless founded upon methodical and well-graduated lessons on classes of words, should be absolutely discouraged in the lower classes; and in Arithmetic, no sums should be set either in the First or Second Standard which the scholars themselves cannot either put down when set in a concrete form or translate into concrete qualities when set in abstract numbers.

The use of the reading book for spelling lessons should also be discouraged. Otherwise the interest in the subject is lessened, and the time which should be devoted to intelligent conversation between the teacher and the class on the matter of the lesson is curtailed.

In connection with object lessons or other similar instruction, the practice of answering by complete sentences, which largely prevails in infant schools, should, whenever possible, take the place of elliptical or simultaneous answering.

Attention might be also usefully drawn to the desirability of employing, in these lower parts of schools for older scholars, women teachers who have had experience of infant teaching, and especially those who have been trained for Kindergarten work.

It should never be forgotten that, unless the lessons themselves are made attractive to these young children by their simplicity of treatment, by the suitability and variety of the illustrations, and by association with their everyday life, the most carefully drawn curriculum, and the most thoughtful arrangement of time-tables will fail to attract the children of those parents, who set little value on the education of their children.

Their Lordships believe that there is nothing in the Code or in the present system of examination that need in the least degree prevent such simple and natural methods of teaching as have been described, and they would be glad to hear of anything that would remove any impediment, should such appear to exist. They desire also to point out that the general intelligence which these methods of instruction tend to foster is of the highest advantage in improving the teaching of other subjects of instruction which form part of the curriculum.

I have the honour to be, Sir, your obedient Servant,
To H.M. Inspector of Schools. G. W. KEKEWICH.

SCIENCE NOTES.

THE LATE PROFESSOR MILNES MARSHALL.—The close of the last year has been marked by an event which will be deplored by all who are interested in Biological Science in England. One of the leading exponents of the modern school of Zoology has been removed from us by a sad accident which befell him on Scafell. Some ten or eleven years ago the scientific world was shocked by the disaster which befell the late Professor F. M. Balfour, who met his death by a fall upon the Alps. A kindred spirit, both in scientific work and in mountaineering pastime was Professor Milnes Marshall, of Owens College, Manchester. Like his distinguished teacher he has been prematurely cut off while in pursuit of his favourite recreation. Professor Marshall started with several companions on the last day of 1893 to ascend Scafell. The ascent was made in safety, and the return partly accomplished, when by some unknown accident, during a temporary halt made for purposes of photography, he fell over a precipice on the mountain and was instantaneously killed. The loss to science in general, and to the Owens College in particular, can hardly be overstated. His researches on the Pennatulida and the Crinoids marked him as one of the most capable pupils of Balfour, and established his fame as a worker in Zoology. His published papers date back to the year 1877; his text books are among the best extant. To his exceptional ability as an organiser scientific progress in the North of England is markedly indebted. Alike in the Owens College, the Victoria University, and the British Association distinguishing evidence of his powers in this direction has been displayed. Professor Marshall was elected a Fellow of the Royal Society in 1885, and was a member of its Council in 1891–2; he was President of Section D of the British Association at the Leeds Meeting in 1890, and gave one of the evening discourses at Edinburgh in 1892.

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DEATH OF PROFESSOR BENTLEY.—Almost at the same time as the younger school of scientific men was called upon to mourn the loss of Professor Marshall, a representative of the older section also left the scene of action. Professor Bentley, who for nearly forty years was one of the leading exponents of Botany in London, died after a very short illness on Christmas-eve. Though he had partially retired from active work, he was still connected with the Pharmaceutical Society, whose chair of Botany and Materia Medica he so long occupied. Professor Bentley was, perhaps, best known as the writer of several text-books of Botany, which long held their

own as some of the best of the older English school. His Manual of Botany passed through many editions, and in many respects is still one of considerable value and importance, the section of it which deals with the systematic side of the science being most minute and careful in its details. Professor Bentley was especially an authority on the bearing of Botany on Materia Medica, and was formerly one of the editors of the *British Pharmacopœa*.

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Relation of Plants to Rainfall.—During the great advance that has been made in recent years in the study of the natural history of plants, many features of their environment have been examined, and their power of resisting adverse influences largely investigated. Recently, still further contributions to our knowledge of this branch of Biology have been made by Professor Wiesner, who has studied particularly the effect of rainfall upon leaves. It is a fact that can be noticed by any careful observer that continuous rain affects different species very differently; some soon shedding their foliage and perishing; others apparently being but little injured by very prolonged exposure to it. Professor Wiesner has made out a certain relationship between the general situation of species and their power of endurance, though the two things are not invariably connected. Most plants that normally grow in dry surroundings fail to stand prolonged wetting. The question of injury or the reverse appears largely to depend on whether or no the leaves can be easily wetted. Many leaves show various protective mechanisms which cause the water to roll off from their surfaces with great readiness, such as waxy secretions or peculiar development of hairs. If the rain succeeds in soaking such leaves, the water exerts a curious putrefactive action upon them, and they perish. That this action is not universal in vegetable structures is evident from the number of plants which are normally submerged. Professor Wiesner considers that such leaves and those which can stand long continued rain are protected by certain antiseptic substances which they contain, which check the development of bacteria in their tissues.

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The Heating of Hay.—It is a matter of ordinary agricultural experience that hay if stacked before being thoroughly dried and matured is extremely liable to become heated in the stack, to such an extent sometimes as to set the latter on fire. The cause of this heating has recently been the subject of examination by the noted agricultural chemist, M. Deherain. Two theories have been advanced to explain the observed facts; the one that it arises from a process of oxidation in the half-matured material, the other that it is due to the action of micro-organisms. The chief objection to the latter view is that the rise of temperature would kill the microbes long before the temperature observed could be reached. M. Deherain comes to the conclusion that the process is initiated by micro-organisms, which cause an increase of temperature in the mass; this is then carried further by processes of oxidation which supervene and which speedily cause a rapid evolution of heat, the final stages in the process being thus of a purely chemical nature, the products of the bacterial action being the subjects of the oxidation.

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A New Method for the Volumetric Estimation of Silver.—Denigès has recently devised a new method for the estimation of salts of silver which is free from the objection that is offered by the ordinary titration by alkaline chlorides, which must be carried out in solutions kept rigidly neutral in reaction. His method is based upon the observation of Liebig that argentic nitrate added to cyanide of potassium without excess of alkali, forms a double cyanide of the two metals, and that excess of the silver salt causes a precipitation of insoluble cyanide of silver. By adding free ammonia to the mixture, and using iodide of potassium as an indicator, the end reaction can be readily observed, the least excess of the silver salt forming iodide of silver, which is insoluble in ammonia. The difficulty of the change of reaction during the titration is thus obviated, it being alkaline all through the operation. Denigès claims that the method will be of special advantage in estimating, by silver titration, the chlorides present in the fluids of the animal body, urine, blood, &c.

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Composition of the Casein of Milk.—The change produced in milk by the action of the enzyme rennet, present in such large quantities in the mucous membrane of the stomach, is to cause the casein of the milk to become a gelatinous-looking solid, the separation being a process of coagulation similar to that of the clotting of shed blood. Various observers have shown that the coagulation is dependent upon the presence of salts of calcium, and particularly the phosphate. A French writer, M. Béchamp, now explains the necessity of this phosphate of calcium, by showing that the casein of the clot differs from all other proteids by containing phosphorus in organic combination. In addition, he finds that sulphur is present in its molecule, and he puts it forward as the first instance discovered of a definite principle containing the six elements, carbon, hydrogen, oxygen, nitrogen, sulphur, and phosphorus.

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The Poison of the Viper.—Recent researches carried out by MM. Phisalix and Bertrand have shown that the poisonous principle which is obtained from the venom of the viper can also be extracted from the blood of the reptile. It appears to be associated with the fluid of the blood, the latter being as toxic after as before the removal of its structural elements. The symptoms which follow injection of either the blood or the serum into an animal are the same as those which are evident after the bite of the snake, and death speedily follows such injection. The authors consider that the presence of the toxic body in the blood is due to an internal secretion from the poison glands, and they attribute to it the well-known immunity of the viper to the venom which it excretes.

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The Ripening of Seeds.—It is well known that many seeds, succulent while in the fruit, rapidly become dry when detached. It has been generally assumed that this loss of water is a question of simple evaporation. Coupin has lately shown that this is not the case, but is a vital process of transpiration dependent on the maintenance of the vitality of the seeds. He experimented chiefly with certain leguminous seeds, and found that they gave off water and lost weight when exposed to an atmosphere saturated with moisture, a condition which would of course prevent any physical process of evaporation. He found further that the out-put of water by seeds killed by superheated steam was very different from that of similar seeds narcotised by chloroform, the action of the living substance being very evident. He found further that light affected the out-put of water by the seeds in the same way as it influences the transpiration of other parts of the plant.

HONOURS PHYSIOGRAPHY NOTES.

BY R. A. GREGORY, F.R.A.S.,

Oxford University Extension Lecturer, Honours Medallist in Physiography, Author of 'Elementary Physiography,' &c.;

AND

H. G. WELLS, B.SC. (LOND.), F.Z.S.,

Lecturer in Geology at the University Tutorial College, Fellow (in Honours) and Doreck Scholar of the College of Preceptors.

Augen Structure and its Meaning.

Mr. Goodchild delivered an important and very suggestive lecture last month before the Royal Scottish Geographical Society, the substance of which appears in the *Geological Magazine* for January. His paper centres on a consideration of what is called 'augen structure' in metamorphic rocks, but he goes on further, to some comprehensive generalizations upon the causes of volcanic action and metamorphism. His views, of course, differ in places from those of other authorities, and the student must bear this in mind. But a student working for Honours Physiography must always keep before him the fact that he is expected to be a little beyond the position of a learner of settled science, and to weigh one view against another.

What is called 'augen'* structure, is an appearance of eye-like inclusions of mineral matter in metamorphic rocks. They are small patches of crystalline or stony matter arranged after the fashion of the minerals of an igneous rock; they do not present any of the foliated character of the schist on which they lie. The wave-like foliæ of this separate and pass around these kernels of unfoliated rock.

A closer study of these 'eyes' has shown that they are always to be ascribed to one of two chief kinds, diametrically opposed to each other. In one kind the unfoliated minerals are cracked and crushed and more or less altered. Apparently in these we have lumps of

* German, *auge*, eye; pl. *augen*.

the original rock which have survived its general metamorphism. In the other kind, the unfoliated minerals are bright and unfractured. From this it is inferred that they have been crystallized during or after the process of change that foliated the rock, and so have escaped the cracking and crushing which distinguishes the former variety. Mr. Goodchild considers that these two sets of structures are so fundamentally dissimilar as to need distinct names. He proposes to call the former variety no longer 'augen structure,' but *flaser structure*. 'Augen structure' he would restrict to the latter class of rock nuclei.

Using 'augen' then in this narrower sense, Mr. Goodchild distinguishes two classes of augen structure, which, however, cannot be defined by any hard and fast line. In one case the minerals in the auge have the chemical composition of the surrounding rock, or at least that rock contains all the chemical constituents of which the auge is composed. But in the other case we find more or less of certain new factors added, *e.g.*, alkaline bases in many cases. A good example of the former are many of the augen consisting of hornblende; of the latter, the felspar augen, containing a considerable amount of potash and soda.

It will be simpler to consider the former case first, as it is simple, and afterwards to enquire a little about the importation of the alkaline bases.

Possible Causes of Local Fusion in the Earth's Interior.

What has happened, apparently, is the fusion of the rock at the auge points. Elsewhere, as the schistose structure testifies, the rock has been reduced to a quasic plastic structure by pressure, but its actual fusion has not taken place.

'It seems obvious,' says Mr. Goodchild, 'from this consideration, that the result cannot be due to the simple action of heat from a source external to the rock, such as would arise either from adjacent molten masses or from any heat proceeding from the earth's interior.'

This is a very important sentence. It weighs very powerfully against the view that the metamorphism of schists, at least so far as they show this structure, can be due to a rapid rise of the geoisothermals downward, such as has been used to explain the Archæan schists. ('Honours Physiography,' p. 153.)

Hence Mr. Goodchild is led to fall back upon an explanation already advanced by other authorities, that the chief cause of this local fusion must be due to the conversion of the motion due to earth-creep into heat. There are numerous causes that may be adduced to account for the local straining and shifting of strata, but among the chief of them Mr. Goodchild is disposed to rank the tidal stress. Reyer's glide-folding theory must not be forgotten here. ('Honours Physiography,' p. 131.) At great depth, where the pressure, and consequently the temperature, is high, this earth-creep may amount to a kind of flow, without actual melting. He adduces the case of the manufacture of nickel bullets to show that solids may be moulded by pressure, that is, their particles may move one over another without actual fusion.

Now the conception of undulatory and differential motions of the earth's crust necessarily implies regions of greater pressure (and therewith temperature) and regions of less. The rocks concerned will also become sheared and foliated. It has been clearly shown that schistose rocks conduct heat most readily in the direction of foliation. Under stresses they will also give way and rupture most readily along their planes of weakness. Hence, in a shearing rock, fractures and slight separations in the substances of the rock may be expected parallel to the planes of foliation. Such separations imply a local relief of pressure, and with the fall in the pressure the intensely heated rock will liquefy at these points to subsequently recrystallise as augen.

Causes of Intrusive and Volcanic Action.

Mr. Goodchild's conception of the way in which volcanic phenomena present themselves to him may be noted here. Imagine a similar but vastly more extensive local fusion of this kind occurring. The molten rock will tend to eat its way upward in the direction of least resistance, the colder masses around will be rendered more flexible, and will tend to shear and move downward to replace the upward movement. At last, near the surface, the molten mass will come into contact with vast quantities of occluded H_2O. The rest of the explanation need scarcely be given here, after our previous notes on the topic.

Augen with New Constituents.

These new constituents are usually alkaline bases in felspars, which may have been brought down from above by percolating water, or, as Mr. Goodchild is more disposed to think, they may have arisen 'in some mobile form' 'from the metallic zones of the earth's' crust. (We must point out that such metallic zones are purely hypothetical.)

In our previous issue we mentioned a few facts about 'Giant Granite' and pegmatite veins, which differ from intrusive veins in not extending beyond the limits of the 'host' rock. It is evident that a local fusion due to a local relaxation of pressure due to a local structural weakness will go far to explain these structures. Pegmatite bands are often roughly parallel, carrying out the 'structural plane' suggestion. They are developed in increasing proportion as the regions of great metamorphism are approached, and at last, if we imagine bands of pegmatite crowding more and more closely, and at last altogether replacing the original rocks, we should have a rock which would at once be recognised as a gneiss.

Thus Mr. Goodchild sees in augen structure the first small development of a change, which carried to a grand scale in one direction leads to the upward intrusion and eruption of volcanic rocks, and in the other, through 'contemporaneous veins,' to the formation of gneiss. In this connection the student will do well to revise the matter devoted to the origin of the Crystalline Schists in our 'Honours Physiography.' And we may remind him again, preferring to repeat a thing rather than have a misconception, that Mr. Goodchild uses 'augen' in a more restricted sense than it has hitherto borne, applying it only to secondary recrystallization knots, and not to primitively crystalline nuclei.

Mr. Shelford Bidwell on Condensation.

In a previous note we have discussed this matter of condensation of atmospheric moisture. We may supplement this by a brief notice of a short paper by Mr. Shelford Bidwell in a recent issue of *Nature*. We will summarise the experiments as briefly as possible, adding to each the inference which it is apparently correct to draw from it.

Observed by Coulier, and subsequently by Aitken, that the presence of a burning substance causes water vapour to condense in a glass globe where previously there had been no condensation. Can this be due to particles of carbon given off by the burning, forming nuclei for condensation? Experiment of filtering the dust out of saturated air through cotton wool. Condensation did not then occur. From this it was inferred *that the chief factor in condensation was dust.*

Observed by Mascart, that air containing a considerable amount of ozone was an active mist producer, even when its dust particles were filtered off. Clearly dust is *not* the chief factor here.

Bidwell, suspecting that the blackness of thunder clouds could not be due to dust, examined the action of electrification on a steam jet. The steam jet became blackened with that coppery-red tint, characteristic of many thunder clouds. Inferred, that electrical attraction made the drops larger, rendering coalescence of 'embryo drops' into visible ones possible. Aitken criticised this, and suggested that the similar electrification of drops would lead to the mutual repulsion and separation, that the thunder cloud is blacker because there are more drops, and therewith more breaking up and dispersal of light in a given space. Barus asserted (1893) that possibly dust might, after all, explain this case, particles being torn off the electrodes by the electric discharge.*

If, however, air in a bottle is electrified and put on one side for a space of fifteen seconds or so—which is, of course, too brief a time for any dust to subside—and then made to impinge upon the steam jet, *no darkening occurs*. Apparently, therefore, it cannot be the electrification or the dust that darkens the jet.

Also, if smoke from a burning substance be similarly put aside for a brief space and then played upon the steam jet, no darkening occurs. Again we infer it cannot be dust.

Certain substances played upon the jet, as, for instance, vapour of nitric and acetic acids, produced condensation; certain others, as ammonia, produced no effect.

Mr. Bidwell is still unsatisfied as to the detailed causation of condensation. But since electrification *per se*, dust, and thermal action, are all put aside by experiment, he is inclined to see some chemical *change in the air* as the actual cause. It cannot be a *combination* of O and N, since a jet of steam can be darkened by electrification in an atmosphere of pure O or of pure N. The only other chemical action electricity can produce in air is dissociation. This seems to narrow the conclusion down to this, that the chief factor in condensation is dissociated atoms of O or N. He really has not proved this as yet, but his research points very strongly to this conclusion. 'The immediate cause is probably to be found in dissociated atoms of atmospheric gases, though as to how these act we can only form a vague guess.'

* Liveling and Dewar have shown that particles *are* thrown off by electrical discharge.

LONDON MATRICULATION.

PREPARATION CLASS FOR JANUARY, 1895.

BY R. C. B. KERIN, B.A. (LOND.),

First in First-Class Classical Honours at Final, Principal, Carlyon College, Chancery Lane, W.C.,

AND J. D. LYNAM, M.A., F.C.P.,

Late Examiner in Mathematics Intermediate Education Board.

LATIN.

Two papers are given in Latin at the Matriculation, which prove perhaps the greatest source of difficulty to candidates whose knowledge of Latin has not been gained at school. Of these two papers one embraces passages from the set-books, questions on grammar and history and geography arising out of these books, and four 'unseens' for translations into English, two only of which are to be attempted. The second paper consists of seven or eight grammatical questions on accidence and syntax, and of sentences to be turned into Latin. A choice is given in the sentences. We propose to notice each month in our course the grammatical points that will require special attention. With regard to the sentences, as special stress is laid on their correct rendering, we shall give each month a miscellaneous set of sentences selected from the book mentioned below. We have found by experience that students who are accustomed to translate a set of sentences embodying various rules, are much better able to face the examination than those who turn into Latin a group of sentences bearing on one rule only.

The books set for January, 1895, are Vergil's Aeneid Books III. and V. The text-books we shall use are Page's edition of Book III. (Macmillan, 1s. 6d.), and Calvert's edition of Book V. (Macmillan, 1s. 6d.). Both of these editions have full notes and very good vocabularies. There is a good translation in the Globe edition, by Lonsdale and Lee. (Macmillan).

In Grammar, we shall use either Postgate's New Latin Primer (Cassell), or Allen's Latin Grammar (Clarendon Press). For Translation at Sight, we recommend Anglice Reddena, by *Jerram* (Clarendon Press). Gepp and Haigh's Latin and English Dictionary will be quite sufficient for Matriculation. For Sentences, we shall use Bayfield's Exercises (Cassell).

Latin Course for February.

1. Vergil Aeneid III. 1–146.

2. Grammar: (α) Postgate, §§ 1–27; §§ 251–277; or (β) Allen, §§ 1–19; §§ 154–160.

3. Translation at Sight: A couple of pieces a week.

4. *Bayfield;* Exercises 5–24, the first three in each: Exercises 24–80, the first one in each. At the head of each exercise are rules and illustrative sentences. Some of our readers may think the number of sentences too great, but it is essential for them to have constant practice. The neglect of this by students often results in a 'casting down of eyes' in the examination. Besides, the sentences given are not long, and there is a vocabulary at the end of the book. Later on, when we have made some progress in the syntax, we shall give typical sentences, with solutions and hints.

Notes on Latin Work.

Vergil. Every unknown word should be looked up in the vocabulary, entered in a note-book, and committed to memory. It may seem needless to some to issue a warning against placing the Vergil and the translation side by side, and trying to fit the Latin and English words together without using the vocabulary. This habit, however, is a favourite one with some students, and is most fatal to success. Each student should make a translation of his own, and then correct it by means of the 'crib.' Special attention should be paid to the irregular verbs that occur, and to historical allusions or grammatical peculiarities. A knowledge of the hexameter metre is not essential; still, as questions are frequently asked, a scheme of the hexameter will be found in the grammar along with rules for quantity. Students should scan a certain number of lines a day till the scheme is mastered. It will help them if they remember that the last foot is a spondee, and the last but one a dactyl.

Supplementary Notes to Page.

3. Note *humo*. 5. The note on the poetical use of the infinitive to express purpose should be marked. A list of poetical usages found in the third and fifth books should be made.

7. The subjunctives are due to the indirect question.

12. Note that the last foot but one is a spondee. This foot is normally a dactyl.

14. Note that *quondam* = 'once on a time.' *Semel* = 'once,' as opposed to twice, thrice, &c.

16. *litore curvo.* Poetical usage of the ablative without a preposition to denote place—'on the winding shore.'

17. *fatis iniquis.* Ablative absolute or ablative of attendant circumstances.

22. *quo summo*—'on the top of which': *cp. summus mons*—'the top of the mountain.'

26. *dictu.* The supine in *u*, or ablative of the verbal noun, is used after certain adjectives.

32. *penitus temptare*—'ascertain thoroughly.'

33. distinguish *alter* and *alius*.

35. *praesidet arvis*—'is lord of the . . . fields': *arvis* is the dative after the verb compounded with *prae*.

36. See note for the subjunctive.

39. *Eloquar. Sileam*—'am I to speak, or am I to be silent?' These are deliberative or dubitative subjunctives.

39. *imo tumulo*—'at the bottom of the mound.'

41. *parce.* The beginner should make up from the grammar a list of verbs that take the dative.

42. *parce scelerare*—'do not defile'; a poetical way of expressing a prohibition which would be in prose expressed by *ne* and the perfect subjunctive, or *noli* with the pres. inf. (never by *ne* and imperative, as beginners are wont to do).

43. Dist. *mānō* (-are) and *mănco* (-ere).

47. The poetical construction *mentem pressus* should be noted. Such an accusative must not be used in sentences.

48. *Stetĕrunt.* The *e* is shortened here.

50. The beginner should notice the contracted form *mandarat* = *mandaverat: alendum* is the gerundive, agreeing with Polydorum = 'to be brought up.'

51. '*iam*' = 'by now,' 'from now on,' 'already'; *nunc* = 'at the present moment.'

54. *res Agamemnonias* — 'the fortunes of Agamemnon.' Note the translation of the adjective by a noun in English preceded by 'of.'

56. pot*itur*. Note the verbs that, like *potior*, take the ablative; *vi* = 'by force.'

57. *postquam, reliquit;* we say, 'when fear *had* left his frame.' The Latins used the perfect after 'postquam' if no definite time is stated.

59. *deum*, genitive plural: *Sit*, subjunctive in a dependent question.

62. *Polydoro*—dative of interest (dativus commodi), 'for Polydorus,' or 'in honour of Polydorus.'

63. *tumulo*—'on the mound'; poetical ablative without a preposition: *Manibus*—dative of interest.

72. *portu*—'from the port'; poetical use of the ablative to denote 'motion from,' without a preposition. When is this allowable in prose?

81. 'with his temples bound with the sacred laurel.' *Tempora* is accusative, used in the same way as *mentem* in 47; the scansion shows that *sacra* is ablative feminine, and therefore agrees with *lauro*.

87. Note *reliquias* Danaum *not* the remnants of the Greeks but the remnants left by the Greeks.

92. *adytis reclusis*, ablative absolute—'in the opened sanctuary'; lit. 'the sanctuary having been opened.'

100. *Sint.* Subjunctive in a dependent question, so also the subjunctives in 101.

104. *iacet.* Distinguish *iaceo* = to lie, and *iacio* = to throw.

105. *gentis cunabula nostrae*—'the cradle of our race.'

109. *optavit*—'chose a place for a kingdom.'

121. *regnis cessisse paternis*—'had gone from his ancestral kingdom'; poetical use of the abl. without a preposition to express 'motion from.'

123. *vacare*—'to be without,' governs the ablative; when it means 'to have leisure for,' it governs the dative.

125. *ingio*, abl. of respect; lit. 'in respect to its ridges.'

The passage from 132 to 146 should be read carefully.

139. *Satis*—'crops.'

141. *Exurere* is the historical infinitive, used in vivid narration when no stress is laid on time. The subject of this infinitive is always in the nominative, hence Sirius.

144. *remenso mari*, ablative absolute; lit. 'the sea having been traversed again.' Translate, 'our father bids us traverse the sea again and go to the oracle of Ortygia.' Avoid the use of the nominative absolute in English.

144. Note the poetical use of the infinitive after *hortor*, where in prose *ut* and the subjunctive would be required.

Grammar.—With regard to the accentuation of polysyllables, the accent is on the penult if the vowel of the penult is long, otherwise the accent is on the antepenult—*e.g. amīcus*, but *amicĭtia*. The genders of substantives have to be known. The rhymes for them should be committed to heart. In the first declension, note the old form in *-ai*, and those words which have the genitive plural in *-um* instead of *-arum*: dat. and abl. pl. in *-abus*. In the second declension note the three neuters in *-us*, and as all neuter nouns are the same in nom., acc., and voc., the acc. sing. of virus, &c. is virus, &c.; *deus* should be known. In the third declension, the list of words, Postgate, § 276, Allen, § 157, should be constantly referred to. Students should learn the rules for the genitive plural in *-um* and *-ium* (noting the exceptions); for the abl., in *-i* and *-e*. The words that end in acc. sing. in *-im* are important. Note that in Cicero words that end in the genitive plural in *-ium* end in the accusation plural in *-is*. In the fourth declension, note the words that have *ubus* or *ibus* in the dative and ablative plural. In the fifth declension, note that *dies* and *res* alone have a full plural.

FRENCH.

The paper in French consists of two parts. Three passages of French are given for translation, two of which are to be attempted. Nine or ten grammatical questions are set, of which the candidates are, as a rule, allowed to do seven. Most of the questions treat of accidence, but syntax questions are sometimes introduced, notably on the agreement of the past participle.

The text books we recommend are:—

1. Fasnacht's French Grammar for Schools (Macmillan, 3*s.* 6*d*), or Professor Darqué's French Grammar (Hughes).
2. Masson's Dictionary (Macmillan).
3. Macmillan's Second French Reader or Hachette's French Reader.

French Course for February.

1. Five pages of translation a week. A certain amount of written translation should be done if time admits. Our readers should make a vocabulary of the words they have to look out, and learn them by heart. The agreement of the past participle should be carefully noted in translation, as well as the order of the personal pronouns.

2. *Grammar.* Fasnacht as far as §18, and in the appendix § 94. The introduction might be read through, though lately historical questions have been dropped. In the chapter on the alphabet notice should be paid to the accents, and the use of the cedilla, the hyphen, and the diæresis. § 8, on the partitive article is important, also § 9. Note the use of *mon*, etc., before a feminine word. The rules for the formation of the plurals and the exceptions should be mastered. Distinguish the plurals of *vantail* and *éventail*. Note the words that have two forms for the plural, observing that (except in the case of *aïeul*) the regular plural has the irregular meaning. Learn a few examples of nouns that (1) are only used in the plural, (2) do not change in the plural, (3) have a different meaning in the plural. Note the plural of compound nouns, also when proper names take a plural.

In Professor Darqué's book read what corresponds to the above paragraph.

GREEK.

In the Greek paper several passages are set from the prepared author. Historical and geographical questions arising out of the subject matter are given. Then there are six or seven grammatical questions on accidence and syntax, embracing grammatical peculiarities found in the author, declension of nouns and adjectives, parsing of verbs. and perhaps a question on οὐ and μὴ or ἄν. Two pieces of translation at sight are also set with a vocabulary of the most difficult words. One piece is in verse, the other in prose. The book for January is Homer, Iliad XXIV. The chief difficulty this presents is the dialect, as there are only 800 lines in the book. Appendix IV. in Abbott and Mansfield's Grammar should be carefully studied and constantly referred to till the dialectial peculiarities are mastered. Full information with regard to the scope of the poem can be got in Prof. Jebb's 'Introduction to Homer,' or in Gladstone's 'Introduction' (Macmillan, 1*s.*) As a text book we recommend Pratt and Leaf's Edition (Macmillan).

There is a good translation of the Iliad by Leaf and Myers (Macmillan). There is also a translation in Bohn's Series (Bell). The Grammar we shall use is Abbott and Mansfield's. For Translation at Sight Macmillan's First Greek Reader by Colson is very suitable. Liddell and Scott's Dictionary (7*s.* 6*d.*) is the best for matriculation. It is useful for students to do exercises into Greek, though the syllabus does not require it, as the process of translation tends to impress the forms and rules upon the memory. Easy exercises in Greek Syntax by Nall (Macmillan) will prove very suitable.

Greek Course for February.

1. Iliad XXIV. 1–82. Make a vocabulary, putting down every word that is not known, and parse all the difficult verbal forms. The uses of the article as a demonstrative and relative should be noted, the frequent use of *tmesis*, the uses of ἄν, οὐ, and μὴ.

2. Grammar. The declensions of substantives. Each paradigm should be learnt, and examples like it declined. A fine set of examples are given pp. 152–156.

In the second declension, ἀνώγεων can be omitted, as it never existed outside grammars, being due to a misreading of a manuscript. Note that words in -ος are either second decl., like λόγος, or third decl., like γένος. Collect in a note-book the different methods of declining words ending in the nom. (1) in ς preceded by α, ι, η, υ, ω or ο, (2) in ν preceded by η or ω, (3) in ρ preceded by ω or η, (4) in α. The irregular words given should be thoroughly known, as they generally furnish a question.

3. Two or three pieces of translation at sight should be done each week.

ENGLISH.

Two papers are set in English—one on History, the other on the Grammar and History of the Language. In each paper a choice of questions is given. Fifteen questions are usually set, of which no more than ten are to be attempted. Generally speaking, three questions treat of the History of the Language: for example, a favourite question is to give a tabular statement of the Indo-European Family of Languages. There is generally a question on the alphabet. One question is devoted to Analysis, which is sometimes obligatory. Very frequently a knowledge of Prosody is required. Last June, the candidates had to give a scheme of the metre of Gray's Elegy and 'John Gilpin.' Five or six sentences are frequently given to correct or justify. The remaining questions deal with the Accidence and Syntax of the Parts of Speech. From this it will be seen that the intending matriculant's knowledge of English Grammar has to be like Sam Weller's knowledge of London, extensive and peculiar. He has been called upon to explain the objection to such a phrase as 'the window opens upon the street,' and to state the source of the expression; he has also been asked to illustrate the facts of English History by words found in our vocabulary.

The period in history extends from the earliest times down to 1700 A.D. The questions are not difficult in themselves, and in our course from month to month we shall point out to our readers what they will have to devote special attention to.

We advise every student to make an analysis. It may be irksome at first, but when he is revising his work he will find out then how much it will lighten his labour. Besides, it will enable him in the examination room to put down what he has to say in a brief and succinct manner, and not in that rambling and incoherent fashion which drives an examiner distracted, and does not improve the examinee's chance of success.

We need not say that candidates in answering should avoid irrelevancy and the tendency to make 'shots.' A sin of omission is much less heinous than a sin of commission. Statements we have had told us, to the effect that 'Sac and Soc' was a Saxon war cry, and that 'investiture' was investing money in the Crown without getting any interest, naturally prejudice an examiner. As geographical questions occur principally in connection with the history, we advise our readers to use Gardiner's Historical Atlas. In English Grammar we shall use Hewitt and Beach's 'Manual of Our Mother Tongue' or Beach's 'Elements' (Hughes), supplemented by 'Historical Outlines of English Accidence,' Morris (Macmillan). 'Matriculation English,' contains a large number of papers set in London, with answers. Reference might also be made to Mason's English Grammar, Trench's book, and Hodgson's 'Errors in the Use of English.' In history we recommend Boyd-Carpenter and Green's History (Hughes), supplemented by Tait's 'Analysis of J. R. Green's Short History' (Macmillan), or the 'Civil Service History,' by Ross.

English Course for February.

(1.) Hewitt & Beach, pp. 1–47, or Morris's Outlines, ch. ix. and ch. x., with Beach's Elements, pp. 3–32.

(2.) History, from the beginning down to the end of Alfred's reign.

Notes.

Grammar.—Constant reference should be made to the English matriculation papers given at the end of H. & B. When the student has read through the work set, he should answer a few of the matriculation questions on the noun, and then correct his answer by the book. The answers in 'Matriculation English' will serve as a model. Too great brevity should be avoided; for instance, if he is asked to discuss the formation of the plural, it will not be enough to say that the plural is generally formed by adding 's.' In a note book brief notes on the following points should be jotted down:—Definition and classification of nouns; personification; different methods of distinguishing gender; masculine words formed from the feminine; history of the different suffixes for gender, number and case; formation of the plural; discussion of words like songstress, seamstress, drake, wizard, witch, bachelor, lord, lady, &c.; remnants of the old inflections; words with two plurals; words with different meanings in the singular and plural; false plurals; double plural endings; words only used (1) in the plural, (2) in the singular; the reason why the possessive case has an apostrophe and the plural has not, except in the letters of the alphabet; plural of compound nouns; relics of the old possessive inflections, *e.g.* Lady-day, Saturday, &c.; the absolute case in English; the parts of speech that have case; Christ his sake; a book of John's.

History.—The following points should be especially noted in the analysis:—The original inhabitants of Britain, their customs, religion, &c.; the various Roman invasions and conquest, with the names of the principal commanders and their British opponents; the results of the Roman conquest; the five provinces; the Roman officials, especially the Count of the Saxon Shore; introduction of Christianity; did the Saxons settle in Roman Britain? The causes which led to the Saxon conquest; the dates of the various invasions, with an account of the conquering tribes; the character of the Anglo-Saxon conquest; the fate of the Britons; the Bretwaldas; the Heptarchy; the rise and fall of the several kingdoms till Egbert asserts the supremacy of Wessex; early codes of laws; the introduction of Christianity by Augustine; Offa's Dyke; the venerable Bede; who was the first king of England? The causes and progress of the various Danish invasions; the Battle of Ethandune and the Treaty of Wedmore; the Five Burghers; Danelagh; Guthrum; Hastings; Alfred's legislative, social and military changes.

MATHEMATICS.

The comparatively large number of really high-class Mathematical Text-books suitable for matriculation, and the certainty that one or other of them is already in the hands of the great majority of our candidates, decide us not to tie ourselves down to any single work, but to make our course as far as possible explanatory of, and additional to, them all. The majority of students, too, have at least occasionally the opportunity of consulting other works besides those they own; and we shall not hesitate to refer them from time to time to useful and interesting points in many different works.

Our procedure during the next twelve months shall be briefly as follows:—In each number we shall indicate a course of reading for each month, to embrace a proper proportion of the whole subject treated, laying stress on the important points, and explaining difficulties. In the following number (in addition to the course for the succeeding month) we shall give any matter not contained in the usual Text-books, but coming within the province of the London Matriculation Examination. This we shall do chiefly by working out old questions set at this examination, or other questions on the same lines.

The two things necessary for success in an encounter with an examination question are rapidity and clearness in selecting the right *Method*, and rapidity and accuracy in the more mechanical process of *Working Out*. The first of these is the more important; for nothing leads more surely to inaccuracy in work than confusion, or want of confidence in the method adopted. The way to acquire both is to work methodically and regularly, whether you work much or little. Work always with a watch before you. Don't scribble on scraps of paper, or even on loose sheets; but go steadily and carefully through a good large exercise-book, leaving every page as if it were to go before an examiner. Mistakes and erasures you must have, even in an examination; but the best candidate in an examination, of two with the same knowledge, is he who can manage his mistakes best. Even from defeat, an experienced general will draw advantage. After you have covered two or three pages with fruitless attempts at some solution, consider carefully *where* you went wrong, especially noticing whether it was in Method or in Working-out; and before you begin again on a new page, be sure that you have a clear perception of the mistake which your work has taught you to avoid. Keep also a small note-book, small enough to fit in the waistcoat pocket, and put down in it a line or two concerning *every mistake you make*, even the smallest numerical blunder, putting also some characteristic mark or number opposite to it on the margin of your exercise book. Spend a certain time every week going through these mistakes. Even such apparently minor points as writing the date and time at the top of the page, numbering the pages of the exercise book, &c., are not to be despised. Constant attention to these details is most irksome to many, but rely upon it, that the more irksome you feel it, the more necessary it is for you. The man with the 'head for mathematics' finds all this natural; and if you have not a 'head for mathematics' you must train yourself until you can do it without effort.

Course for February.

Algebra.—Factoring and its applications; *i.e.*, Least common multiple, multiplication and division of fractions, addition of fractions. Write in your small note-book one example of each kind of factor given in such books as H. Smith's or Hall and Knight's Algebra. These and others contain enormously too many examples identical in method. Do every third, or every fourth question, as you have time; but do not select them at random.

Arithmetic.—Meaning of *measure*, *multiple*, *factor*, *prime number*, *numbers prime to each other*, &c. Rules for divisibility by 2, 3, 4, 5, 6, 8, 9, 11, and proofs of the same. Method of forming a table of primes. Method of factoring, &c. On all these points Haugh's Higher Arithmetic (Simpkin and Marshall) is very full. Find and

learn the factors of 91, 111, 117, 119, 161, 221, 1001, &c., and a table of the squares of numbers up to 30.

Euclid.—Look through Book I. No matter what may be said to you, you will still find it pay wonderfully well for the small amount of trouble involved to *learn the order* of the propositions, which comes really to learning the numbers. You will thereby acquire a familiarity and confidence impossible without it. Get the following riders done :—

1. If the diagonals of a parallellogram are equal, it must be a rectangle.

2. Two straight lines AB and CD cut at X, and the lines AC, CB, BD, DA are drawn. If AC and BD are parallel, show that the triangles AXD and CXB are equal in area.

3. From a point P on the diagonal AC of a parallelogram ABCD straight lines are drawn parallel to the sides. Show that the triangle PBD is one-half the difference of the parallelograms about the diagonal AC.

4. In any triangle show that the sum of the lines joining any point within it to the angular points is less than the perimeter, and greater than half the perimeter of the triangle.

5. The base and difference of the squares of the sides of a triangle are given ; find the locus of its vertex.

MECHANICS.

All the introductory remarks on mathematics above apply equally to mechanics. Suitable text-books are not, however, so easily obtained. Wormell is hardly sufficient. Magnus is usually found difficult ; but the new edition is a great improvement on the older ones. An excellent book is Loney's (Clarendon Press Series), but unfortunately the trigonometrical methods used spoil it to some extent for matriculation. I shall give occasionally the necessary modifications in the proofs given in this book.

Course for February.

Definitions of velocity ; how measured when uniform, and how when variable ; proof of $D=Vt$. Parallelogram and triangle of velocities. Composition and resolution of velocities. Relative velocity and change of velocity in a given time.

CHEMISTRY.

Parts I. and II. of Reynold's Chemistry form an exceedingly thorough course for matriculation ; though doubtless containing a good deal more than is necessary for a mere pass. Jago and Ira Remsen are also good.

In order to have any chance of retaining in the memory the equations representing the different reactions, the pupil must have some knowledge of the valency of the common elements, and of the constitution of the commoner 'metallic salts,' *i.e.*, the compounds of the metals and non-metals.

For instance, hydrochloric acid is HCl. Potassium (K), sodium (Na), ammonium (NH_4), and silver (Ag) are monovalent, or monad ; *i.e.*, they combine with, or replace one atom of hydrogen or chlorine. Therefore the chlorides of these metals are KCl, NaCl (common salt), NH_4Cl (sal ammoniac), and AgCl. Calcium (Ca), lead (Pb), and others are dyad, and combine with, or replace two atoms of H or Cl ; so that their chlorides are $CaCl_2$, $PbCl_2$, &c. Try to form a list of the formulæ of the oxides, hydrates, chlorides, sulphates, and nitrates of hydrogen, potassium, sodium, ammonium, calcium, lead, iron, and copper.

Course for February.

Above and *hydrogen*.—Learn its *physical properties* ; *i.e.*, physical state, whether solid, liquid, or gas at ordinary temperature, colour, taste, smell, density, freezing and boiling points, solubility in water, &c. (the last only in a roughly relative fashion), apart from its chemical properties, *i.e.*, atomic weight, valency, and number and nature of its compounds with other elements. These should be noted with regard to every element. Of hydrogen, note its affinity for oxygen, causing to act as a 'reducing agent' on hot copper oxide, ferric oxide, &c. (Give equations for these reactions.) Note preparation of hydrogen (1) from water by certain metals, and note the metals, (2) from acids by metals, (3) by electrolysis.

HEAT AND LIGHT.

A good book is Lee's, in Collins' series. Avoid *popular* works, where the grain of science is wrapped up in a bushel of padding. They teach you to think you know a science when you know it not.

Course for February.

Expansion of solids and liquids ; coefficient of expansion ; relation between coefficients of cubical and of linear expansion ; experiments on expansion ; compensating pendulums and balance wheels ; formula correcting lengths or volumes of same body at different temperatures. [We prefer it in the form $L = Lo(1 + \alpha t)$, or $Vt = Vo(1 + \gamma t)$]. Experimental methods of finding coefficients of expansion ; apparent and real expansion of liquids in solid envelopes ; the weight thermometer.

NOTES AND NOTIONS.

BY RICHARD WADDINGTON.

HEARTY congratulations, Mr. Ellery! To be the Vice-President of a Union over 25,000 strong is an honour that brings with it responsibilities, but the Union has confidence in the ability and loyalty of its newly-elected Vice-President. The unanimous election is a fitting recognition of enthusiastic industry.

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'THIRTY thousand for Manchester,' should be the watchword of Unionists for 1894. The day for going cap in hand to the Non-Unionist is past. The hope of the Union lies in the fidelity of its 25,000 members, and the enrolment of the annual additions to the ranks of certificated Teachers.

> 'Ther' are critters so base, thet they want it explained,
> Jes' wut is the totle amount thet we've gained.'

And to these we are prepared to appeal ; but to the selfish Non-Unionist, who wants the Union's representative to beseech and entreat, we can afford to say : 'The Union can do without you, but it is doubtful whether you can do without the Union.' With the possibility of a guinea entrance fee, and the existence of Security of Tenure, whose enforcement may probably mean expensive litigation, the Union can afford to leave the Non-Unionists to the rude awakening that lies before them.

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THE Christmas holidays would appear to be the 'Conference Season.' The Higher Grade Schoolmasters assembled at Leeds ; our Scotch colleagues assembled in Edinburgh ; and the Church Teachers' Benevolent Committee assembled in London. Truly the Teacher is a self-sacrificing mortal in matters educational. At Leeds there was much about Science and Art, and not a little about grants. Dr. Forsyth's address was a very practical *resumé* of the present unsatisfactory state of Secondary Education. The debate that followed brought out the wisdom of never discussing the President's address. I need only mention one contention made by Mr. Bidgood : 'For his part he wanted to do his own primary work,' and that of Mr. Dyche, 'If they could begin with Standard I., so much the better.' If these are the contentions of the Teachers of Organised Science Schools, they pave the way for the serious discomfiture of those who maintain that the Higher Grade School should be the

secondary school, or, as I have heard it contended, the University of the Primary School. My experience is, that the ordinary school does the Standard work as well, if not better, than the Higher Grade School. If it is allowed that Teachers in Organised Science Schools are experts in teaching Science, surely it will be allowed that the ordinary Primary School Teachers are expert in teaching the work of the Standards.

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Our friends 'across the border' were favoured with an unusually strong deputation from the N.U.T. The President and Mrs. Burgwin were both the guests of the Scottish Teachers. Mrs. Burgwin's eloquence and interest in the cause of the orphans seems to have roused the Scottish Teachers into the creation of a Benevolent Fund. Mrs. Burgwin said :—'In England the women took their stand side by side with the men in professional work, but in Scotland the men seemed to take the lead entirely; there were, indeed, few head mistresses, as the chief of a school was usually a man. Again she recommended the women to take up the question of infant school education, and do their best to raise the minimum age to five. She also declaimed against large classes, in which true Kindergarten teaching was absolutely impossible, and then proceeded to advocate increased emoluments for assistants, as their numbers and relative importance had increased. A very large school meant a good place for one fortunate individual, and assistantships for the rest, but she preferred smaller schools, and more Head Teachers.'

With which every genuine Teacher will heartily agree, I feel sure. The robustness and sincerity of Mrs. Burgwin's utterances must have done much to rouse the Scottish mistresses.

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The Church Teachers' Benevolent Fund is evidently passing through 'the lean years.' Its conference at the end of 1893 was a series of lamentations. As a Church Teacher and a subscriber to both the N.U.T. and Church Teachers' Funds, it seems to me that the time has arrived for the amalgamation of the two funds. Why should there be two sets of officials, and a duplicate cost of administration? We have passed the time when creeds divide our benevolence as Teachers. The N.U.T. Fund meets all classes and sects of Teachers, and is well administered. Teachers cannot subscribe to both. My experience is that the N.U.T. Fund acts more quickly and more generously when appealed to. I believe if the subscribers to the Church Teachers' Fund were appealed to they would very plainly decide on merging the organisation in the N.U.T. There can be no doubt about this, that a considerable sum that now goes in expenses would be devoted to relieving distress.

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Looking through the Blue Book issued by the Science and Art Department which gives the results in Drawing and Manual Instruction in Elementary Schools, during the year ended August 31, 1892, one is struck by the number of cases in which, in lieu of the amount of grant, there is printed 'not claimed.' In one case a school of 400 scholars marked 'excellent' is returned 'not claimed.'

Some of the general results are interesting, and if they had been less matured by age might have been more useful. I give a few :—

District.	Scholars.				Pupil Teachers.	
	Average Attendance.	Excellent.	Good.	Fair.	No. Presented.	No. Passed.
England and Wales	1,499,355	2,819	9,526	4,695	11,294	5,784
Bedfordshire	8,714	18	73	33	93	49
Cheshire	39,187	68	254	94	322	179
Cornwall	13,256	15	132	115	266	109
Cumberland	15,904	46	156	45	234	130
Lancashire	221,032	393	1,055	336	1,443	777
Middlesex	145,661	209	410	99	506	287
Yorkshire	185,942	472	1,070	367	1,110	579
Wales	72,518	95	597	571	1,109	461
Cambridgeshire	1,492	12	55	93	107	55

* * * * *

It is very largely true that one half of the world does not know how the other half lives. It is quite true that the Urban Teacher is hardly able to realise how wealthy some of the schools in rural England must be since the advent of compulsory Drawing. Here are a few of the returns in the Blue Book :—

School.	County.	No. Taught.	Average.	Award.	Total Grant.
					s. d.
Fulletly	Lincoln	3	2	G.	2 6
North Farnbridge	Essex	6	4	E.	8 0
Turkdean	Gloucester	6	5	G.	3 9
Broughton	Bucks	3	4	G.	3 6
Addington	,,	6	6	E.	11 0
Pantsaph	Flint	7	5	E.	9 6
Llanelltyd	Merioneth	4	4	E.	7 4
Helland	Cornwall	8	8	G.	9 0
Llwyngwril	,,	5	3	G.	3 5
Mantmel Gaufron	Radnor	5	5	G.	7 6
Whitewell	York	10	8	E.	16 0
West Halton	,,	4	4	E.	5 4
Soothill, Chidswell	,,	6	6	E.	12 0
Ryther	,,	7	8	E.	16 0

Can you wonder the managers have not thought the 2s. 6d., or the 3s. 6d., worth the trouble of claiming? Imagine what an admirable supply of apparatus these grants will supply.

* * * * *

There are hundreds of cases where the grant is less than a sovereign, nay, ten shillings. Remember that in these schools next year the Department will require, probably, a set of models that will cost three or four years' grant at least, and don't forget that the Inspector who examined the school and the examiners in London between them received twenty-fold the grant awarded. What we want to drive home, and what I believe can be driven home, is the fact that if two shillings per head is sufficient for a school of 500 scholars it is not sufficient, nor anything like sufficient, for a school of five scholars. Take the Lincolnshire school: the half-crown received would be gone at 'one fell swoop' if three packets of the cheapest drawing cards were purchased, to say nothing of paper, pencils, and rubber. Then there is the payment of the Teacher.

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Imagine the country Teacher tramping mile after mile to gain the coveted 'D.' Think of the weighty

cogitations of the managers on receipt of the half-crown Postal Order for the Drawing Grant. But the payment of the Teacher: it would appear to be the opinion of My Lords—

'Twould be endless to tell you the things that he knew.'

* * * * *

Just as we are becoming expert draughtsmen, carpenters, linguists, laundresses, cooks, and dress-makers, we are to begin a mad rush for the gymnasium. Compulsory physical exercises without payment would appear to be Mr. Acland's next move.

'I found me in the school 'us' on my seat,
Drummin' the march to No-wheres with my feet,'

will soon be true of those of us who have not rushed off to Timbuctoo to arm ourselves with the diploma of some well-blown nursery in physical exercises.

* * * * *

Do not misunderstand me. I am strongly in favour of physical training. But physical training requires teaching, and Teachers must live. Suitable physical exercises require musical accompaniment, and a musical instrument is expensive. I hope the Teachers will protest most strongly against this continual addition to the curriculum without addition to the grant. Physical exercises might be coupled with singing and the singing grant doubled. So long as you have children working six hours a day in the mill, to make physical exercises compulsory will be cruel, and the Society for the Prevention of Cruelty to Children ought to step in. If my boy goes to the Grammar School it costs at least ten guineas a year to educate him, but if he goes to a primary school one-fifth of that amount suffices. The grant does not suffice for the proper equipment of the school at present, and it is time we, as Teachers, made that plain to the people.

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The question of the tests in arithmetic set at examination was much to the front a year ago. The demand for three sums right out of four, including the problem, is absurdly high. Why should not there be at least three problems on each card so as to give the child a choice? It does not follow that because the child fails to do the particular problem he cannot do problems. The same applies to the tests in geometry in the fifth, sixth, and seventh Standards. There ought to be a choice of questions offered.

* * * * *

The advocates of 'Age only' as the qualification for labour should note the following extract from the *Bucks Herald*. The Aylesbury Rural Sanitary Committee had the letter from the Education Department on the raising of the total exemption age to 11 before them. On the attendance officer reading the 'suggested Form of Note to be appended to existing Bye-laws:—

'"In such of the above Bye-laws as provide for the total or partial exemption of children from the obligation to attend school, the age of *eleven* years is, by the operation of the Elementary Education (School Attendance) Act, 1893, substituted for the age of *ten* or for any age lower than *eleven*."

'—The Chairman said the alteration proposed was one of the most arbitrary pieces of business transacted for a long time. This new arrangement would prevent children earning their own living, as they could not all find clerks' and governesses' situations. He thought that those who passed such ridiculous Acts should carry them out. He supposed it was an order of the Education Department.—The Clerk: No; it was an Act of Parliament passed this year.—Mr. Gunn: I did not see anything about it being passed.—The Chairman said that another question which would affect the rate-payers was the fact that if children were to be kept at school longer they would have to increase the accommodation at the schools, and the increased grants required from the Education Department would also fall heavily upon the taxpayers. It was a very serious matter when looked at in that light.—It was resolved to order a number of copies of the letter, stating the proposed alteration, for distribution.'

* * * * *

The circular just issued by the Education Department on the instruction of Pupil Teachers would be admirable if the conditions created by the Department's regulations did not make the carrying out of the demands impossible in the very schools intended to be improved. The Pupil Teacher commences too young—at 13 he, or she, may become a qualified member of the school staff. Schedule V. is as illogical and inimical to progress as it would be possible to conceive. The examination of the Pupil Teacher is too hurried. The weak are not 'weeded out' at the end of the second year, and in too many cases the Pupil Teacher is struggling with a large class for six hours a day, and is thus unfitted for real study. The Teacher is often required to teach three or four Pupil Teachers taking as many courses of history and geography. Surely it is not too much to ask that the history and geography may be so arranged that simultaneous work may be possible. I have already in 'Notes and Notions' given what I consider a workable plan. No school should have more than two Pupil Teachers.

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The circular on the teaching of the Lower Standards I take to be connected with alterations in the coming Code. If not, then it is doomed to fail so long as the present mechanical accuracy in arithmetic and spelling is demanded.

MODERN EDUCATIONAL REFORMERS.

BY THOMAS CARTWRIGHT, B.A., B.SC. (LOND.),
Author of 'Mental Science and Logic for Teachers.' Late Director of the Birkbeck Training Classes and Lecturer therein on School Method.

VI.—HERBERT SPENCER.

Spencer, like Bain, claims the teachers' attention because of the eminent service that he has rendered to the theoretical side of teaching. It has been asserted by one of our most eminent experts in pedagogics, that only three English works on teaching have received the honour of translation into foreign tongues, and consequent circulation in foreign lands. One of these books is Spencer's 'Essay on Education, Intellectual, Physical, Moral,' the other two being Locke's 'Thoughts Concerning Education,' and Roger Ascham's 'Schoolmaster,' and of the three the palm as to popularity must certainly be given to the most recent work.

At the first blush it will seem passing strange that teachers who have given their time and intelligence to the study of right methods of teaching, even from their youth upwards, should have to sit at the feet of a theorist like Spencer, who has had no experience whatever in teaching; but, upon consideration, the strangeness at once vanishes, for the philosopher and the psychologist are not far from the pedagogue, possessing, as they do, just the very qualities which

are needed to winnow out the true from the false in educational practice, and to place the rules and devices which experience may seem to dictate upon the broad basis of mental science. Such was the aim of Spencer, and how well he has succeeded the growing popularity of his book will show.

This may seem an insignificant achievement, but, in sober truth, it is wonderful testimony to the worth of the book, both literary and philosophic, for hitherto pedagogics has spelt bankruptcy to the British publisher, amongst whom there was formerly about as much desire to publish a work on the ravings of a lunatic as upon the art of teaching. That the style of the book is epigrammatic and wonderfully picturesque no one will deny, but, the style apart, there is still sufficient merit in the matter to warrant the closest attention of every teacher who believes that there is really and truly an art and a science of teaching.

Herbert Spencer was born at Derby in 1820. His father was a professor of mathematics in his native town, and the education of the future philosopher was undertaken by the professor and his brother, a clergyman. Civil engineering would not seem to have much in common with philosophy and pedagogics; still it was in this capacity that young Spencer first made his bow to the world. Not for long did he pursue this career. Literature, that will-o'-the-wisp which entices so many and rewards so few, spread its toils for the young engineer not in vain, and literature and journalism became the pursuits to which Spencer's energies were devoted. In due time the embryo philosopher became sub-editor of a Birmingham daily, and later on he occupied the same position in the office of the 'Economist.' Meanwhile his fertile brain had not been working fruitlessly, for in 1851 appeared his first great work, entitled, 'Social Statics, or the conditions necessary to human happiness specified and the first developed.' This was followed in 1855 by the 'Principles of Psychology,' and in 1861 appeared the great educational classic with which we are more directly concerned.

The immense amount of interest which this book has created may be guaged from the fact that sixteen editions have been exhausted, and that it has been translated into several languages.

Many other important works have been produced by Spencer, the most important being 'The Principles of Sociology,' Part V. of which is a dissertation on Political Institutions, and Part VI. a thesis on Ecclesiastical Institutions, both of which have roused much interest and given rise to much discussion.

Spencer now resides at St. John's Wood, his health being very poor on account of insomnia, with which he is sorely troubled.

We now proceed to examine in detail the book which entitles the philosopher to be included in this reformers' corner. The essays are four in number, and Chapter I. deals with the curriculum, which should comprise the teaching of all sciences to everybody, if Spencer is to be followed, for the answer which our author ingeniously supplies to the question, What knowledge is of most worth? is on all counts Science. This obvious overstatement is still of yeoman service, as it draws attention by its boldness to the manifold claims of science for inclusion in all curricula, an opinion which is now held by the veriest tyro in education, and this desirable result is in no small measure due to the efforts of Spencer. Another change which is also ably advocated in these essays is the substitution of the useful for the ornamental in education—the abolition of the so-called accomplishments, to be repiaced by subjects which are both useful in themselves as aids to complete living and also useful in developing faculty. The second chapter deals with intellectual education, and it is no exaggeration to say that this essay is considered, either from the point of view of form or of matter, a model of exposition. Deliciously epigrammatic and refreshingly outspoken, it is no wonder that it should have taken its readers by the ear and compelled attention. As we have already dealt with these two chapters in the November and December issues of 1892, we shall refer our readers to these numbers for a consideration of the views put forth in these absorbingly interesting essays, just contenting ourselves with an outline of the positions taken up by the author. Every question concerning reform, we are told, passes through three stages—(1) the unanimity of the ignorant; (2) the disagreement of the enquiring; and (3) the unanimity of the wise. In proof of which we are reminded that formerly all men were Romanists in religion, followers of Aristotle in philosophy, and monarchists in politics, added to which they were believers in the dogma, 'believe and ask no questions,' as indicating the right rule to follow in all acquisition. On all sides the scene has undergone a change. No longer blindly accepting the belief and practices of the fathers and what they have declared unto them, the inquiring spirit, like the schoolmaster, is abroad, and the day of the unanimity of the ignorant has yielded place to the dawning of the disagreement of the enquiring, which disagreement, painful and perplexing as it undoubtedly is, yet subserves the useful purpose of bringing about a division of labour in the search for a well-balanced and scientific educational theory. These, then, are the days of the spirit of enquiry, coupled with the distraction which is inalienable from the existence of rival schools of thought, each believing enthusiastically in the efficacy of its own particular recommendations. Pursuing this line of thought, the author next, in masterly style, endeavours to formulate the doctrines upon which there is practical unanimity, which doctrines must, however nebulously, foreshadow what the principles of the New Education will be, following this up by the enunciation of some of the wisest words and most sagacious counsellings to be found in the literature of school method. Again referring the curious reader to our former papers on the first two essays, we pass on to the third, which deals with Moral Education, and wherein is minutely enunciated that doctrine of punishment known to men as the discipline of consequences, the guiding principle of which is the belief that for every offence, and for every shortcoming, there exists a natural and efficacious punishment. 'When a child falls, or runs its head against the table, it suffers pain, the remembrance of which tends to make it more careful; and, by the repetition of such experiences, it is eventually disciplined into proper guidance of its movements.' 'Let it be further borne in mind that these painful reactions are proportionate to the transgressions . . . and then mark, lastly, that these natural reactions which follow

the child's wrong actions are constant, direct, unhesitating, and not to be escaped. No threats; but a silent, rigorous performance.' 'Still more significant will these general truths appear, when we remember that they hold throughout adult life as well as throughout infantine life.' 'Is it not manifest that, as "ministers and instructors of Nature," it is the function of parents to see that their children habitually experience the true consequences of their conduct—the natural reactions; neither warding them off, nor intensifying them, nor putting artificial consequences in place of them.' These extracts will indicate the views which Spencer holds, but to the opinion 'that no unprejudiced reader will hesitate in his assent,' we retort that very few, if any, thoughtful teachers will be able to subscribe to them; for, in the first place, natural consequences are frequently so horribly disproportionate to the offence, notwithstanding what is said to the contrary, that it would be nothing short of brutal to leave ignorant childhood to such harsh and indiscriminate discipline; secondly, the remoteness of the consequences causes the connection between backsliding and suffering to be hopelessly obscured; and thirdly, the offence which would most commonly meet with condign punishment is nothing more than mere ignorance, and experience is a hard school, in which it may be desirable that fools should be disciplined, but from which we all must feel impelled to pray that children may be delivered. Before the days of Spencer it had occurred to the veriest neophyte in the art of child-management to make full use of the discipline of natural reactions, when and where such usage could be safely allowed,—thus far and no farther,—and our author's sweeping statement of the universal application of this law, which he has so ably and so lucidly enunciated, must be whittled down to just these proportions. His Constance, who never could be got to put on her things until mamma and governess were on the point of setting out, would, we feel sure, in ninety-nine cases out of a hundred, have been left in the lurch; and it is somewhat unfortunate for Spencer's advocacy of his favourite principle that 'it never occurred to mamma to let Constance experience the natural penalty.' With the principle we do not quarrel; on the contrary, we urge upon teachers the wisdom of its adoption within the region of its applicability; as to the universality of its application, that we utterly reject as a most patent fallacy. The 'extreme cases' would be so common, although Spencer cannot see this, that the author's own words practically amount to a statement of the above position, which is that of all educationists. He says, 'Of course, in those *occasional hazards* (the italics are ours) where there is a risk of broken limbs or other serious injury, forcible prevention is called for. But, leaving out extreme cases, the system pursued should be, not that of guarding a child from the small risks that it daily runs, but that of advising and warning against them.' In his contention that loss of esteem should be so managed as to constitute a dreaded punishment, we can enter heartily, for 'the moral pain, consequent upon having, for the time being, lost a loved friend, stands in place of the physical pain usually inflicted, and proves equally, if not more, efficient.' English teachers, who are so frequently told to look abroad for model management of children, will relish the following. To account for the reformation of an unmanageable boy, 'a mother explained that at various schools in Paris this elder brother had proved utterly intractable; that in despair they had followed the advice to send him to England, and that on his return home he was as good as he had before been bad.' This remarkable change was ascribed entirely to the comparative mildness of the English discipline. The following maxims are deduced by the author from his exposition of principles:—

1. Do not expect from a child any great amount of moral goodness.

2. Leave him, whenever you can, to the discipline of experience.

3. Do not, however, seek to behave as a mere passionless instrument. Whilst *secondary* kind of punishment (displeasure of the teacher or parent) should not usurp the place of the *primary* kind, it may in moderation *supplement* the primary kind.

4. Be sparing of commands, but whenever you do command, do this with decision and consistency, for of errors in education one of the worst is inconsistency.

5. Remember that the aim of your discipline should be to produce a *self-governing* being; not to produce a being governed by others.

6. Recollect that to educate rightly is not a simple and easy thing, but a complex and extremely difficult thing, the hardest task which devolves on adult life.

As a set off against the German invasion which is so frequently deplored in these days of German clerks, the patriotic bosom may indulge in a comforting glow when reading the following tribute to the national character: 'German teachers say that they had rather manage a dozen German boys than one English one. Shall we, therefore, wish that our boys had the manageableness of German ones, and with it the submissiveness and political serfdom of adult Germans? or shall we not rather tolerate in our boys those feelings which make them free men, and modify the method accordingly?' Although a digression, it will be pardoned if one turns aside to congratulate oneself upon the fact that our free men, at all events, are *not* 'made in Germany.'

The concluding essay is upon physical education—a trite subject, viewed from the standpoint of Mr. Acland's answer in the House erstwhile. The gist of the whole charge is contained in the following words: 'We see infinite pains taken to produce a racer that shall win the Derby; none to produce a modern athlete. Had Gulliver related of the Liliputians that the men vied with each other in learning how best to rear the offspring of other creatures, and were careless of how best to rear their own offspring, he would have paralleled any of the other absurdities he ascribes to them.' He advocates a reform which would have delighted poor Oliver Twist when he says that, with respect to food, more should be given until the child cries 'Hold, enough!' This, we think, would not answer; furthermore, a liberal meat diet is recommended, and vegetarianism is made utterly discreditable. In our humble opinion this will not hold water; rather should we recommend a less liberal meat diet, although not a purely vegetable one. Dyspepsia, we think, is the discipline of consequences as applied to the English vice of excessive eating of animal food.

Quality and variety, as our author recommends, should certainly be conspicuous, and we also subscribe to the view that in the clothing of children there is plenty of room for reform, especially as regards the legs and chest of younger children. The quiet sarcasm which is meted out to the proprietors of those charming establishments which turn out young *ladies* is admirable. 'We have a vague suspicion that to produce a robust physique is thought undesirable; that rude health and abundant vigour are considered somewhat plebian; that a certain delicacy, a strength not competent to more than a mile or two's walk, an appetite fastidious and easily satisfied, joined with that timidity which commonly accompanies feebleness, are held more lady-like.' This view is, happily, become a pious opinion of a few, and is soon destined to become, as the dodo, extinct, much to the satisfaction of our author, who would have girls exercised and developed physically as well as intellectually and morally. Over-cramming and much burning of midnight oil get no sympathy from Spencer, who enlarges upon the necessity for giving less time to study and more time to sleep and exercise.

Summing up, we are told by the author that 'the physical education of children is thus in various ways seriously faulty. It errs in deficient feeding, in deficient clothing, in deficient exercise, and in excessive mental application. . . . . Instead of respecting the body and ignoring the mind, we now respect the mind and ignore the body. We do not yet realise the truth that, as in this life of ours the physical underlies the mental, the mental must not be developed at the expense of the physical.

We must now take leave of our reformer, whose claim to the name needs not our feeble advocacy. Still we may be permitted to urge upon those of our readers who are not as yet acquainted with the winged words and wise of the St. John's Wood sage with regard to matters pedagogic, to lose no time, but with all expediency to get the book and study it carefully, not doubting but that their reward will be certain in the shape of much pedagogic lore.

LEGAL AND CODE QUERIES COLUMN.

RULES.

1. All communications must be addressed 'Legal Editor, PRACTICAL TEACHER, Froebel House, St. Andrew's Hill, Doctors' Commons, E.C.,' and must be accompanied by our 'coupon,' duly filled up.
2. Replies will be given *only* in this column, except under the conditions named in Rule 3.
3. If any reader desires a reply by post, such can be forwarded by enclosing, in addition to the coupon, a stamped addressed envelope and either stamps or a Postal Order to the value of one shilling.
4. No original documents should be forwarded, but copies only. We cannot hold ourselves responsible for any losses which occur through non-observance of this rule.

'M.R.'—It is a common mistake. The 'Four Estates of the Realm' are, (1) The Queen, (2) The Lords Spiritual (Archbishops and Bishops), (3) The Lords Temporal (Nobles and Law Lords), (4) The Commons. The formula of introduction to all Acts of Parliament recites these 'Estates.' It runs thus:—

'Be it enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same,' &c., &c.

'S.L.'—Cheques may be 'crossed' in different ways. The most usual method is that of drawing across the body of the instrument two parallel lines, and inserting between them '& Co.' The payee of the cheque then usually adds the name of his banker. It serves the purpose of some security if the cheque is lost, since it can only be paid by the banker upon whom it is drawn to another banker. It need not necessarily be paid in to the account of the payee, but can be cashed through the account of any customer of the bank presenting it.

'CALLED TO THE BAR.'—The bar is a partition running across the Courts of Law, behind which all outer barristers and every member of the public must stand. Queen's Counsel are admitted within it. The position of barristers is fixed immediately behind the bar, hence the expression 'called *to* the bar.' When a barrister takes 'silk' (*i.e.* is made a Q.C.), he is 'called *within* the bar.'

'R.W.'—The fact that the terms of the agreement have not been reduced to writing does not render it less valid, but it renders proof of its existence more difficult; if you can clearly prove that such an agreement existed, your claim is valid, and can be enforced in a Court of Law.

'SCALE OF MARKS.'—'My Lords have under consideration the publication of the scale of marks (including those assigned to the different Drawing and Science Certificates), and if it is found to be practicable, they will publish the scale.' So wrote Mr. Kekewich, Secretary to the Education Department, some weeks since.

'PHILOMATH.'—The following extract from a letter of the Education Department answers your query:—

'I am directed to state that there is no rule at present which prevents an Acting Teacher from counting the same Science over again in his Second Year.'

'M.L.'—(1) No. (2) Yes, most certainly.

'T.T.'—The Civil Service Year Book and Official Calendar (published by Sheppard and St. John, St. Bride Street, Ludgate Circus, E.C.), will supply you with the required information. The price is 2s.

'DRAWING.'—Regulations recently issued do not prevent a Pupil Teacher from being examined, both at his own school and a School of Art, in the same Calendar Year, provided that it is not *in the same subject.*

QUERY COLUMN.

St. John.—(1) A person buys shares in a railway when they are at 19½, £15 being paid, and sells them at £32 9s. when £25 has been paid; how much per cent. does he gain?

(2) What must be the market value of 5 per cent. stock, in order that after deducting an income tax of 6d. in the £, it may yield 4½ per cent. interest?

(1) Gain on $(£19\frac{1}{2} + £10) = £32\ 9s. - (£19\frac{1}{2} + £10)$.

Gain on $£29\frac{1}{2} = £32\ 9s. - £29\ 10s.$

$= £2\ 19s.$

$\therefore £29\frac{1}{2} : £100 :: £2\ 19s. : \text{Gain } \%$

$$\frac{2}{59} \qquad \frac{20}{59}$$

$= 10\%$ Ans.

(2) Percentage before deduction of income tax

$$= £4\tfrac{1}{2} \times \frac{40}{39}$$

$$= \frac{3}{\cancel{9}_{2}} \times \frac{\cancel{40}^{20}}{\cancel{39}_{13}} £$$

$$= £\tfrac{20}{13};$$

$$\therefore £\tfrac{20}{13} : £5 :: £100 : \text{Price of stock}$$

$$= \frac{5 \times \cancel{100}^{20} \times 13}{\cancel{60}_{3}} £$$

$$= \frac{325}{3} £$$

$$= £108\tfrac{1}{3};$$

$\therefore$ Price of stock $= £108\frac{1}{3}$. Ans.

Alice.—A and B invest each the same sum of money in 3 per cent. stock at 91, and 3¼ per cent. stock at 97½, A purchasing an equal amount of each kind of stock, B dividing his money equally between the two stocks; who receives the larger interest, and if their incomes differ by a 1s., how much money did they invest?

If A has £100 of each stock his income will be

$$£3 + £3\tfrac{1}{4} = £6\ 5s.,$$

And he will invest $£91 + £97\frac{1}{2} = £187\frac{1}{2}$;

B will then invest ½ of £187½, or £93¾ in each stock;

∴ B's income will be

$$\left(£3 \times \frac{91\tfrac{3}{4}}{91}\right) + \left(£3\tfrac{1}{4} \times \frac{93\tfrac{3}{4}}{97\tfrac{1}{2}}\right)$$

$$= £\frac{3 \times 375}{91 \times 4} + £\frac{\cancel{13} \times \cancel{375}^{25}}{\cancel{4} \times \cancel{390}_{\cancel{30}_{2}}}$$

$$= £\frac{1125}{364} + £\frac{25}{8}$$

$$= £3\ 1\tfrac{1}{4}s. + £3\ 2\tfrac{1}{2}s.$$

$$= £6\ 4\tfrac{57}{182}s.$$

$\therefore$ A receives larger interest. Ans.

Difference in incomes $= £6\ 5s. - £6\ 4\frac{57}{182}s.$

$= 1\frac{125}{182}s.$

$\therefore 1\frac{125}{182}s. : 1s. :: £187\frac{1}{2} :$ Amount invested

$$= \left(\frac{\cancel{375}^{3}}{\cancel{2}_{1}} \times \frac{\cancel{182}^{91}}{125}\right) £$$

$= £273$. Ans.

OUR 1894 CERTIFICATE CLASS.

BY DR. GEORGE BEACH, M.A.,

Co-Author of a 'Manual of our Mother Tongue,' 'A Girls' Arithmetic,' Author of 'Elements of English,' 'Entertaining Readers,' 'Historical Readers,' etc.

i. It is with considerable difficulty that we write this article, labouring as we are under the great disadvantage of not having the Department's Certificate Syllabus before us (which, at the time of writing, had not yet been issued), and being compelled to advance under the reflected light of the past.

More serious is this disadvantage, owing to the fact that 'My Lords' do not yet seem to have decided whether the 1894 examination shall be in July or December.

Probably no change will be made till 1895, or otherwise the preparation time would be reduced to a maximum of six months.

ii. We recommend the following books:—

(*a*) *Men and Women.*

(α) *Miscellaneous.*—Heller's or Yoxall's Code, Stormonth's Dictionary, Dunstan's 'Teachers' Manual of Music,' Hughes's Certificate Copy Book, Hughes's 'Art of Handwriting,' Halford-Hawkins' 'Art of Reading and Reciting.'

(β) *School Management.*—Flux's 'School Management,' Cartwright's 'Mental Science.'

(γ) *Arithmetic.*—Wollman's 'Teachers' Arithmetic.'

(δ) *Geography.*—Gregory's 'Physical and Astronomical Geography,' Brook's Geography, 'Multum in Parvo' Atlas, and Hughes's 'How to draw a Map.'

(ε) *History.*—Boyd-Carpenter and Green's 'Outlines of British History,' Green's 'Main Facts and Dates of British History.'

(ζ) *English.*—Dr. Beach's 'Element's of English,' Dawson's 'Paraphrasing.'

(η) *Language.*—Huxley's 'Latin Course' or Darqué's 'French Course.'

(*b*) *Men only.*

(α) *History.*—Davies' Historical Manuals, 1603 to 1689 and 1688 to 1714 (Literature).

(β) *Mathematics.*—Pendlebury's Arithmetic, Hamblin Smith's Algebra, Knight's 'Mathematical Wrinkles,' Deighton's Euclid, Egan's Euclid Exercises, Parts I. and II., Todhunter's Mensuration.

(*c*) *Women only.*

(α) *History* (2nd Year).—Davies' Historical Manual (1485–1603).

(β) *Arithmetic.*—Dixon and Beach's, Dr. Beach's Standard VII. Cards.

(γ) *Domestic Economy.*—Hughes's, Mrs. Beach's Domestic Economy, Parts I., II., and III.

(*d*) *General Remarks.*

(α) Moffatt and Page's *Hamlet* and *Coriolanus* are excellent works. It will be well to add the Clarendon Press edition. Messrs. Macmillan's *Spenser*, *Le Misanthrope*, *Coming and Passing of Arthur*, *The Princess*, and Collins' *Bacon*, by Lewis, are the best to purchase. At present we cannot hear of a good annotated edition of *Macaulay's Essay* on *Moore's Life of Byron.*

iii. DIFFICULT WORDS TO BE PARSED.

FIRST YEAR.

(*a*) *First Friday.* (*Men.*) *For, many, ere, ever, waging, still, over seas, what, so, there, wherein, more, failed, one.*

(*Women.*) *All, day, until, up, to, thither, flocked, child, half, borough, patron, there, visiting.*

(*b*) *Third Monday.* (*Men.*) *Passing, thence, deserving, to be joined, as, that, there, lift, up, to, happiness, vext, stars, hollow, saving, be joined, that, as, nothing.*

(*Women.*) *Smiling, pretty, were, charge, girl-graduates, should, more, as, emperor-moths, so, yet, Lilias, however, some.*

(*c*) *Third Saturday.* (*Men.*) *Foughten, knights, saying, if, ought, wife, whom, debating, how, holp, give, saving, son, lifted, chamberlain, required.*

(*Women.*) *Chanced, while, betrothed, princess, proxy-wedded, old, still, murmurs, youths, wore, tress, all, both, swarm, as, bees.*

SECOND YEAR.

(*d*) *First Wednesday.* (*Men.*) *Says, 'tis, but, let, belief, lay, touching, seen, therefore, along, that, come, approve.*

(*Women.*) *Friends, care, patricians, suffering, as, strike, as, whose, will, on, cracking, than, knees, must, where.*

(*e*) *Fourth Monday.* (*Men.*) *Ay, springes, when, how, tongue, daughter, giving, than, heat, extinct, even, as, a-making, must, be, something.*

(*Women.*) *Have pressed, but, known, whether, west, mutinous, enemy, who, than, three, whether, likely, consider.*

LATER.

Having now the much-delayed Syllabus to hand, we append a few more remarks.

It will be seen that we rightly surmised that there would be no change in the date of the Examination for 1894, but that this would be instituted in 1895, when the time will be June or July, if Parliament do not reject the idea.

As might be expected, this great alteration impending next year has minimised the alterations made this year.

Three points which we have always advocated have been conceded.

(*a*) The objectionable terms '*Male*' and '*Female*,' which apply just as well to the brute as to rational creatures, have been at last abandoned in favour of the more dignified designations '*Men*' and '*Women*.'

(*b*) The policy of secrecy has been discarded, and reverting to the older and wiser practice, 'my Lords,' have revealed the number of marks obtainable for each subject.

(*c*) The *failing subjects* are indicated.

May we now ask for a further concession, viz., that in the examination papers themselves, the number of marks for each question be appended?

THE CHANGES are as follows :—

A. FIRST YEAR.—MEN.

(*a*) Those taking Sciences must note that 'it is proposed next year to insert provisions further limiting the number of Sciences for which marks may be obtained by any candidate.'

(*b*) The first paragraph on *p.* 3 is made a little more explicit by the addition of the words, '*unless in substitution for Geography or History as provided above.*'

(*c*) See (*e*) '*Women*.'

(*d*) See (*f*) '*Women*.'

(*e*) *Penmanship* becomes *Penmanship* and *Spelling*, the latter having four-thirds of the marks of the former.

B. FIRST YEAR.—WOMEN.

(*a*) As for '*Men*.'

(*b*) The following is omitted :—'*Only a percentage of the marks for Domestic Economy will be given in the case of those Students who do not present a certificate signed by the Superintendent, to the effect that she is satisfied with their practical proficiency in some specified portion of industrial training.*'

(*c*) A mere verbal alteration in paragraph 2 (English). [Paragraph 1 last year].

(*d*) The parsing and analysis is not specified as to be taken from 'the prescribed poem,' and 'Principles of Grammar' is added.

(*e*) The composition is to be upon a '*given*' instead of a '*familiar*' subject.

(*f*) Welsh and Hebrew are added to the languages.

(*g*) The following is omitted, probably by a '*slip*': 'In colleges attended by both male and female students, the reading exercises may be taken from either the above list, or the list in the syllabus male candidates, at the discretion of the Principal.'

(*h*) See (*e*) '*Men*.'

C.—SECOND YEAR, MEN.

(*a*) 'SCHOOL MANAGEMENT' is split into '*School Management and Teaching*,' the former only carrying two-thirds of the marks for the latter.

(*b*) Herbert Spencer is omitted.

(*c*) Algebra and Geometrical conic sections (group (*g*) of 1893) is omitted.

(*d*) Welsh and Hebrew are added to the languages.

D.—SECOND YEAR, WOMEN.

(*a*) *Penmanship* as in First Year, Women (*h*).

(*b*) *School-Management* as in Second Year, Men (*a*).

(*c*) See (*b*) Second Year, Men.

(*d*) Expenses and investment of money is made a separate section of Domestic Economy.

(*e*) See (*g*) First Year, Women.

(*f*) The Grammar, Analysis and Paraphrase, is not specified to be from the prescribed play.

(*g*) Verbal alteration in paragraph 2 of English.

(*h*) Verbal alteration in paragraph 3 of English.

(*i*) As in (*d*) Second Year, Men.

(*j*) The words '*in poetry as well as prose*' are left out from the language section.

LANGUAGES.

Languages.	First Year, Men.	First Year, Women.	Second Year, Men.	Second Year, Women.
Latin	Sallust's 'Cataline,' chaps. 1–39.	As for Men.	Sallust's 'Cataline.'	As for Men.
Greek	Xenophon's 'Hellenica,' book 3.	—	As in First Year.	—
French	Sardeau's 'Mademoiselle de la Seiglière.'	As for Men.	As in First Year. Molière's 'Misanthrope.'	As for Men.
German	Schiller, 'Thirty Years' War,' part II.	As for Men.	As in First Year. Schiller's 'Der Graf von Habsburg,' 'Hoffnung,' and 'Das Lied von der Glocke.'	As for Men.
Welsh	Cymon Fu, 126 pp.	As for Men.	As in First Year.	As for Men.
Hebrew	Book of Genesis.	As for Men.	As in First Year.	As for Men.

FAILING SUBJECTS.

(*a*) ***First Year, Men.*** Reading and Repetition, Penmanship, Spelling, English, Composition, Arithmetic.

(*b*) *Second Year, Men.* As in First Year, except that 'Teaching' is added, and Grammar, Analysis, and Paraphrase is substituted for English.

(*c*) *First Year, Women.* As for First Year, Men, plus Sewing and Cutting-out.

(*d*) *Second Year, Women.* As in first Year, Women, with the addition of 'Teaching.'

TABLE OF MARKS.

Subjects.	First Year.		Second Year.	
	Men.	Women.	Men.	Women.
Reading and Repetition	100	100	100	100
Penmanship	75	75	75	75
Spelling	100	100	100	100
School Management	80	80	80	80
Music	40*	40*	80	80
English	100	100	100	100
Composition	30	30	30	30
Geography	75	75	75	75
History	75	75	75	75
Arithmetic	80	100	—	100
Mental Arithmetic	40	—	—	—
Algebra and Mensuration	100	—	*	—
Geometry	100	—	*	—
Languages	200	200	200	200
Sciences	200	200	200	200
Drawing	200	200	200	200
Domestic Economy	—	75	—	75
Sewing, etc.	—	100	—	125
Teaching	—	—	120	120

* The marks for these subjects are either not given at all, or only obscurely.

The changes for 1895 are very important, but these will be subsequently treated of.

MODEL ANSWERS TO QUESTIONS SET AT CHRISTMAS EXAMINATION, 1893.

SCHOOL MANAGEMENT. MEN AND WOMEN—FIRST YEAR.

Tuesday, 12th December, 10 to 1.

Candidates must not answer more than FIVE *questions from either Section, or more than* EIGHT *questions in all.*

N.B.—*If more than the prescribed number of questions are answered, only that number of answers coming first on the paper will be revised.*

SECTION I.

i. (*a*) Explain the value and use of 'Object Lessons.' Say what educational purposes they may serve, and how a course of them should be arranged. (*b*) Give a graduated list of 20 subjects which would be appropriate for a class of scholars of six, *or* of ten years old.

(*a*) *Object Lessons* are valuable and useful chiefly as aids in—

(1) Developing in the juvenile mind an interest in the world around them;

(2) Connecting school training with the actual circumstances of life;

(3) Arousing, exercising, and training the senses;

(4) Developing the observation, reasoning, and judgment;

(5) Supplying correct and properly arranged information about common things, and

(6) Promoting self-education.

As *Object Lessons* should afford a basis of knowledge, and as we should 'proceed from the known to the unknown,' a course of them should be arranged in conformity with the lives and surroundings of the scholars, types of various classes being so dealt with that an intelligent child shall hereafter unconsciously apply the processes of the lesson to investigating the properties of similar objects.

(*b*) *List of twenty subjects suitable for 'six year olds'*:—

(1) *On things at home* (6).
- (α) Food. Bread as a type.
- (β) Beverages. Water as a type.
- (γ) Clothing. Wool as a type.
- (δ) A house.
- (ε) Furniture. A table as a type.
- (ξ) Warmth and light. A fire as a type.

(2) *On things at school, etc.* (2).
- (α) Books.
- (β) Writing materials.

(3) *On the child itself* (2).
- (α) Parts of the body.
- (β) The senses.

(4) *On things in general* (10).

A. *Animals* (4).
- (α) Cat, or horse, etc. (beast).
- (β) Hen (bird).
- (γ) Herring (fish).
- (δ) Snail or snake (reptile).

B. *Vegetables* (3).
- (α) Grass (herbage).
- (β) An apple (fruit).
- (γ) Potato (root).

C. *Minerals* (2).
- (α) Iron (metal).
- (β) Coal (non-metallic).

D. *Manufactured articles* (1).
Glass.

ii. Write full notes of a lesson on *one* of these subjects:—
- (*a*) Greatest Common Measure.
- (*b*) The Mariner's Compass.
- (*c*) Words ending in *tion*.
- (*d*) *Iron and Steel* (*Infants*).

(*a*) *On Greatest Common Measures:*—

Class—Standard V.: *Time*, 40 minutes.

Apparatus—Two-foot rule, weights, coins, etc.

Educational Objects—(1) To impart knowledge; (2) to promote mental insight; (3) to improve the calculating powers.

Presupposed Knowledge.—The four simple rules, knowledge of factors, and prime numbers.

Matter.

1. A *Measure* of a number or quantity is contained an exact number of times in that number or quantity. The number containing the Measure may be called a Multiple.
2. A *Measure* may be *common* to more than one number.
3. A Multiple may have more than one *Measure*.
4. A *Prime number* is one that cannot be factorised.
5. The *Greatest Measure* of a number is the greatest number that will exactly divide it.
6. The *Greatest Common Measure* (G.C.M.) is the greatest number that will exactly divide into two or more numbers.
7. The Greatest Common Measure is the product of the common factors.
8. The Greatest Common Measure is obtained by 'alternate division.'

Method.

1. Six is contained an exact number of times in twenty-four; six inches in two feet; four ozs. in a lb.; and 3d. in a shilling. A measure is akin to a factor, and a multiple to a product.
2. Six is also contained an exact number of times in twelve, in eighteen; six inches in one foot eighteen ins. and two feet. Give instances of similar uses of the word *common*. If there be two numbers, one of which measures the other, that number is a *common measure* of both.
3. Twenty-four is measured also by twelve, eight, four, three, two. Of course unity and the number itself are always measures of that number. Fifty-nine and one, both measure fifty-nine.
4. Give instances of prime numbers. Every number not prime must have at least two measures. Two prime numbers have no common measure except unity.
5. This definition excludes the number itself as being practically useless.
6. This definition can be trained from the children, for they have been taught, what a *Measure* is; a *Common Measure*, and a *Greatest Measure*.
7. G.C.M. of 1881 and 8118 is 99, for $1881 = 99 \times 19$, and $8118 = 99 \times 82$; 19 and 82 being prime to each other.

Explain the difference between prime numbers, and numbers prime to each other.

8. *Examples*— 13 and 91 (one division),
91 and 104 (two divisions),
104 and 195 (three divisions).

Ans. 13)91(7	91)104(1	104)195(1
91	91	104
..	Ans. 13)91(7	91)104(1
	91	91
	..	Ans. 13)91(7
		91
		..

N.B.—(1) The proof of this process will occupy the major portion of another lesson.

(2) Children must give illustrative examples at end of every section.

iii. (*a*) Say what are the requirements of the Code for children in the Third Standard, both for elementary and for class subjects. (*b*) Give the titles of twelve poetical pieces which are suitable for recitation by such children.

(*a*) See Code, Schedules I. and II.

(*b*) (1) 'Boadicea,' by Cowper.
(2) 'Casabianca,' by Mrs. Hemans.
(3) 'Lighthouse,' by Longfellow.
(4) 'The Schoolmaster,' by Goldsmith.
(5) 'We are Seven,' by Wordsworth.
(6) 'The May Queen,' by Tennyson.
(7) 'Isaac Ashford,' by Crabbe.
(8) 'A good time coming,' by Mackay.
(9) 'Bishop Hatto,' by Southey.
(10) 'The Daisy,' by James Montgomery.
(11) 'Three Fishers,' by C. Kingsley.
(12) 'Abou Ben Adhem,' by Hunt.

iv. Make a list of the employments and manual exercises which you consider most useful and interesting in the training of very young children, and say what is the special educational value of each.

Some of the most useful and interesting employments and manual exercises for young children are (*a*) Pricking, (*b*) Exercises with jointed lath, (*c*) Mat-plaiting, and (*d*) Clay-modelling.

(*a*) Pricking conduces to manual dexterity, and imparts a knowledge of number and shape.

(*b*) The jointed-lath exercises excites the invention, assists in analysing the elements of form, and is a vehicle for much elementary knowledge.

(*c*) Mat-plaiting gives delicacy of touches, teaches number, colour, and form, affords an idea of symmetry of arrangement and chromatic taste.

(*d*) Clay-modelling greatly interests the child, stimulates the creative faculty, gives some notion of solid-content, and of various properties of matter, and imparts a knowledge of form.

v. (*a*) Say what is meant by a good style of questioning, and what are the tests by which you would distinguish a good from a bad question. (*b*) Discuss the value of catechisms.

(*a*) Questions may be divided into three classes. (1) Tentative, (2) Instructing, (3) Examining. If the style of the questions be adapted to secure these objects, they are skilfully propounded. Do they lay a foundation for information; do they impart information, or do they ascertain how far information has been assimilated? If these questions can be favourably answered the style is probably good.

The following tests, as a rule, will distinguish good from bad questions:—

They must not be (α) too numerous, (β) capable of mechanical or monosyllabic answers, (γ) ambiguous, (δ) too suggestive, (ε) beyond children's range.

They must (ξ) preserve logical sequence, (η) excite reasoning processes, (θ) be conveyed in simple language, (ι) require sentences as answers, and (κ) take advantage of and utilise wrong answers.

(*b*) Catechisms are valuable as (1) occupying the catechumen, (2) breaking up knowledge into digestible morsels, (3) being suitable to logical arrangement, (4) epitomes for more extensive courses.

They are disadvantageous as (1) tending more to knowledge than education, (2) fostering 'cram,' (3) being, through constant use, uninteresting, (4) appealing to the memory more than the reason.

vi. Describe a good method of teaching, either (*a*) the elements of home geography to very young children, or (*b*) latitude and longitude to an advanced class.

(*b*) *Latitude and longitude.*

A large globe and a tellurium are essential appliances.

(1) *Latitude* is distance north or south of the equator, and is generally measured by degrees on meridians. As every circle has 360° in its circumference, and as from pole to equator is one-quarter of a circle, the maximum latitude, that at the poles, never exceeds 90°. At the equator the latitude is 0°. In the northern and southern hemispheres the latitude is called N. and S. latitude respectively.

Parallel to the equator are drawn smaller circles, 'parallels of latitude.' All places on the same parallel are of the same latitude.

(2) *Longitude.*—As there is no natural boundary meridian separating east from west, an arbitrary one is assumed. The English reckon that passing through Greenwich as zero. All places east or west of this meridian are E. or W. longitude respectively.

(3) On any regular surface the position of a point is known if it be supposed situated at the intersection of two known lines. Thus by giving the latitude of a place, the parallel on which it is situated is known, and the longitude indicates the meridian, and the two data together the exact position.

(4) Latitude can be obtained by observing the altitude of fixed stars, the polar star being the most convenient for this purpose. As we advance north, any star to our north appears to increase a degree in altitude as we travel a degree. If we consider the polar star to be on the horizon, to an observer at the equator its altitude will be 45°, in latitude 45°, and 90° altitude at the pole.

(5) Longitude is best ascertained from the difference of local and Greenwich time. The sun appears to travel round the world in 24 hours, or 15° per hour. Therefore 15° E. of Greenwich it is noon an hour sooner, or in other words, when it is 11 o'clock at Greenwich, it is 12 o'clock 15° E. of Greenwich. On the other hand, it will only be 10 o'clock 15° W. of Greenwich.

If, then, whilst travelling, we carry a chronometer keeping Greenwich time, and also observe the sun at its zenith (this gives local noon), we can from difference of time calculate the longitude.

It must be remembered that the local time is unaffected by the latitude, it being the same at every place on the same meridian.

Section II.

vii. (*a*) Name, in the order of their natural development, the principal mental faculties which the teacher has to cultivate. (*b*) Say what special lessons are most appropriate in the training of each.

(*a*) The principal *mental* faculties should be cultivated in the following order:—(α) memory, (β) imagination, (γ) conception, (δ) judgment, (ε) reasoning.

(*b*) (α) *Memory* is cultivated by the acquisition of any knowledge, but lessons in geography, history, mathematical tables, accidence, and repetition are especially useful.

(β) *Imagination* should be an advance on memory. Descriptions of scenes (geography), of events (history), and of conditions, and perhaps drawing, are peculiarly helpful.

(γ) *Conception* is assisted by anything involving comparison, classification, abstraction, and generalisation. Lessons on form, colour, sound, and on classes of objects (such as metals), greatly aid its development.

(δ) *Judgment* is appealed to in lessons on morals and duties, in the mechanical processes of arithmetic, and in the reproduction of drawing or writing copies.

(ε) *Reasoning* is exerted in the theory of arithmetical rules, and in problems of any kind. Investigating the office of words (i.e. *case* in nouns) is an excellent exercise.

viii. (*a*) Say what are the intellectual processes concerned in an effort of memory. (*b*) Show in what way such an effort is dependent on the principal of association.

(*a*) *Memory* consists of both *retention* and *reproduction*. That these two processes are perfectly distinct is proved by temporary forgetfulness of some fact and subsequent remembrance thereof.

Reproduction is either active of itself, when it is called *Reminiscence*, or stimulated, in which case it is named *Suggestion*. Probably Suggestion covers much of what is generally deemed the province of Reminiscence.

(*b*) Suggested reproduction is that portion of memory which depends upon association.

ix. (*a*) How far can the methods of Fröbel encourage inventiveness and individual effort on the part of children? Give examples.

Fröbel's method operated along the lines of the three mental activities—knowing, feeling, and willing. Of these three, our question refers to the first as regards *inventiveness*, and to the third with respect to *individual effort*. He aimed at making the activities *self*-acting, and his whole system tended to make education proceed by *self*-development.

All '*The Gifts*,' without exception, encourage inventiveness. Gift I. will suggest to the children different combinations of colour, Gift II. of position, Gifts III. to VI. of solid shapes, Gifts VII. to IX. of surfaces, and so on.

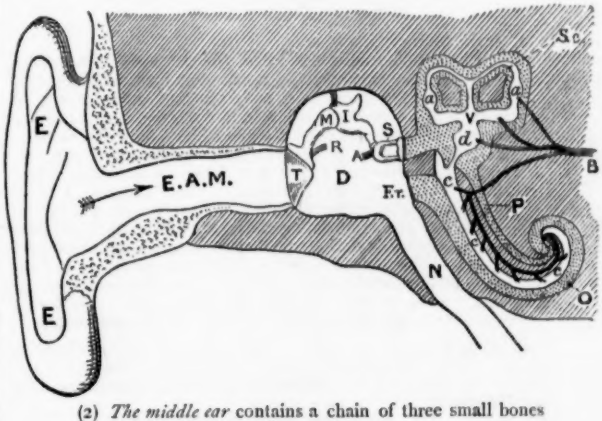
Again, *inventiveness*, as it is a natural quality, cannot be developed *but by individual effort*.

Fröbel never checked inventiveness by teaching children in the gross, but by consulting idiosyncracies.

x. (*a*) Describe, fully, the process of hearing, and the organs concerned in it. (*b*) What can be done in school discipline to make hearing more sensitive and exact, or to improve the voice?

(*a*) (α) The organ of hearing consists of three parts (1) *the external*, (2) *the middle*, and (3) *the internal ear*.

(1) *The external ear* consists of the auricle and the auditory canal, a tube about 1¼ inches long. Between the external and middle ear is the tympanum, a membrane tightly stretched across the passage, and extremely susceptible to vibrations.



(2) *The middle ear* contains a chain of three small bones connected with the internal ear.

(3) *The internal ear* consists of a series of curved chambers and winding passages, at places separated and lubricated by fluids, and lined with filaments. These chambers and pas-

sages are connected with the auditory nerve by four principal and innumerable subsidiary branches.

(β) In ordinary cases the waves of sound are transmitted through the external ear and impinge upon the tympanum, the vibrations of which set in motion the bones of the middle ear. These again agitate the fluids and filaments of the internal ear which stimulate their connected nerve fibres. Thence the auditory nerve conveys the impressions to the brain.

(*b*) (α) *Sensitiveness of hearing* can be improved by the quietude of the schoolroom, by insisting upon habits of attention, and by enforcing cleanliness.

(β) *Exactitude of hearing* may be promoted by musical ear tests, by clearness of enunciation, and by attention to the acoustical properties of the room.

xi. (*a*) Which is the more important factor in school education—learning or thinking? (*b*) Describe the difference. "(*c*) Point out by what lessons the powers of reflection and understanding may be best developed.

(*a*) *Thinking* is decidedly more important than *learning*.

(*b*) Learning is a mere effort of the memory; thinking a much higher operation. The former merely lays in a stock of facts for the latter to manipulate, arrange, and ofttimes transform. Memory has little to do with true education, thinking is essential thereto.

(*c*) This section has been answered in (δ) and (ε) of Question VII.

xii. Character has been defined as a 'completely fashioned will.' (*a*) What does this mean? (*b*) Say by what sort of discipline and exercise the will may be trained in a school.

(*a*) When the *will is completely fashioned* it has assumed a definite mental form, with certain favourite lines of action, certain dislikes, and even certain habits. It is susceptible to some stimuli and inert to others, so that it confers upon its possessor a character and disposition of his own.

(*b*) The *will can be trained* chiefly by means of pleasure, pain, concentration, and emulation.

Pleasure (and relief) may be afforded by novelty in subject or method, by judicious praise and rewards, and in one thousand and one other ways. It attracts the will.

Pain (and diminution of pleasure) can be inflicted by operations contrary to those conferring pleasure, and may affect the body or the mind. It deters the will from certain volitions.

Concentration removes impediments from the action of the will, and allows free play to its full force.

Emulation, or a desire to excel either absolutely, or relatively to one's fellows, may be induced, and is a powerful will stimulus.

SELECTED GOVERNMENT QUESTIONS.

FIRST YEAR.

First Week.

1. Write in large-hand the words, '*Syllabus changes.*'

Write in small-hand the words,

'*Australian boys read Crusoe's life,*
By Sydney's sheltered beach.'

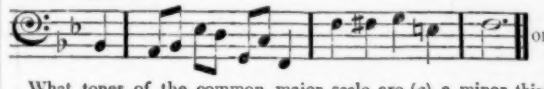
2. Write from dictation :—

It has often been found | that profuse expenditure, | heavy taxation, | absurd commercial restrictions, | corrupt tribunals, | disastrous wars, | seditions, persecutions, | conflagrations, inundations, | have not been able | to destroy capital | so fast as | the exertions of private citizens | have been able to create it. | It can easily be proved | that, in own own land, | the national wealth has, | during at least six centuries, | been almost uninterruptedly increasing. | This progress, | having continued during many ages, | became at length, | about the middle | of the eighteenth century, | portentously rapid, | and has proceeded, | during the nineteenth, | with accelerated velocity. | In consequence | partly of our geographical | and partly of our moral position, | we have, during several generations, | been exempt from evils | which have elsewhere | impeded the efforts | and destroyed the fruits of industry. |

3. What is meant by mental suggestion, or the 'Association of Ideas'? Give some examples, and show in what sort of school lessons the 'Principle of Association' is of most importance, or is best illustrated.

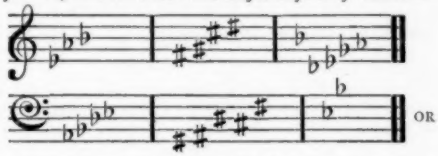
4. What are the mental processes concerned in an act of remembering? Distinguish between memory of words and the memory of things, of facts or of truths. Say when, and how far, a teacher is right in requiring the exercise of merely verbal memory.

5. Write the following passage in the Treble Clef to sound two octaves higher :



What tones of the common major scale are (*a*) a minor third apart, and (*b*) a minor fourth apart?

6. Arrange the sharps or flats of the following signatures in their customary order, and state for what major keys they stand :—



What circumstances tend to modify the mental effects of scale tones?

7. Analyse the following passage and parse the words in italic :—

(*Men.*) *Many* a petty king *ere* Arthur came
Ruled in this isle, and *ever waging* war
Each upon other, wasted *all* the *land;*
And *still* from time to time the heathen host
Swarmed *over seas* and harried *what* was left.
And *so there* grew great *tracts* of wilderness,
Wherein the beast was ever more and *more,*
But man was less and less, *till* Arthur came.

(*Women.*) Sir Walter Vivian *all* a summer's day,
Gave his broad lawns *until* the set of sun
Up to the people : *thither* flocked at noon
His *tenants,* wife and *child,* and thither half
The neighbouring *borough,* with their Institute,
Of which he *was* the patron. I was *there*
From college, *visiting* the son,—the *son,*
A Walter too,—with *others* of our set.

8. Write a brief essay on either (*a*) The Uses of the Telephone, or (*b*) Thrift.

9. Give the extent, boundaries, peninsulas, and islands of (*Men*) North America, (*Women*) Asia.

10. Draw a map of (*Men*) the St. Lawrence, (*Women*) Political Hindostan.

11. Enumerate the countries and chief towns of (*Men*) North America, (*Women*) Asia.

12. (*Men.*) What sovereigns reigned during the 17th century; give dates? How were they descended from Henry VII.? Describe the character of James I.

(*Women.*) Account for the comparative ease of the Norman Conquest.

13. What do you know of the various feudal incidents?

14. What length must be cut off from a piece of land 110 yards wide that the area of the dissevered part may be 2·625 acres?
Ans. 115·5 yards.

15. (*Men.*) Prove that if $\sqrt{a} = m + \sqrt{n}$, m must be zero. Find the square root of $18 + 2\sqrt{77}$. Ans. $\sqrt{11} + \sqrt{7}$.

(*Women.*) Find the value of

$$\left(\frac{\cdot 0019}{3\cdot 16} \times \frac{4\frac{1}{2}}{2000}\right) \div \left(\frac{8\cdot 8}{5\frac{1}{2}} \times \cdot 571428\right).$$ Ans. 5·90625.

16. (*Men.*) $\sqrt{3+x} + \sqrt{x} = \dfrac{6}{\sqrt{3+x}}$. Ans. 1.

(*Women.*) What are the chief processes through which food passes in the process of digestion? Why is bread unsuitable for very young infants?

17. (*Men.*) The sides of a field are 27, 364, 357, and 76 yards respectively, and the angle between the first two is a right angle. Find the area in acres. Ans. 3·81 acres.

(*Women.*) Set in and work a flannel patch two inches square.

18. (*Men.*) Write out Euclid III., 1.

Show how to describe a circle through three points. When is this impossible?

(*Women.*) Into how many classes may food be divided? Name them, describing their chief qualities.

Classify the following :—Cheese, fruit, brown bread, milk, oatmeal, mutton, sugar, salt, potatoes, cabbages.

19. (*Men.*) Write out Euclid II., 4.

Prove that if the rectangle contained by the two parts of a divided line be equal to one-quarter of the square on the whole line, the line is bisected.

SECOND WEEK.

1. Say what is the earliest form of mental power observable in the history of a young child, and show by what sort of school exercises you could encourage and develop it.

2. At what point in your teaching of arithmetic would you introduce 'rules,' and require them to be learned? Give a sketch of a model lesson on 'division by factors,' showing when and how you would teach the rule for that operation.

3. It is said to be a good principle in teaching that 'we should proceed from the known to the unknown.' Discuss this dictum; and show how it ought to regulate, for example, the mode of commencing a lesson on some unfamiliar object.

4. Write out brief notes of a lesson on one of these subjects :—

(*a*) The Cases of Pronouns.
(*b*) The House of Commons.
(*c*) (*For Infants.*) Snow and Hail.

5. What is meant by the faculty of observation, and why is it desirable to cultivate it? Give some examples of exercises calculated to strengthen this faculty, (1) in a rural school, or (2) in a school situated in a large town.

6. Describe the kind of manual employments best suited to give, to very little children, ideas of form and of construction, and to give early training in invention and design.

7. If the following passage occurred in a reading book, what explanations or illustration would you think it desirable to give in connection with it?—

'Of all the living creatures that people the immensity of the ocean, the cetaceans, or the whale family, are the most perfect. Their anatomical construction renders them in many respects similar to man, and their heart is susceptible of a warmth of feeling unknown to the cold-blooded fishes, for the mother shows signs of attachment to her young, and forgets her own safety when some danger menaces her offspring. Like man, the cetacean breathes through lungs, and its heart pumps to all parts of its body streams of warm, red blood.'

8. The Code directs that the earliest lessons in history for young children should be anecdotal and biographical. Give reasons for this recommendation, and mention a few leading incidents in English History which you think might be usefully narrated to learners before their regular chronological study of English History begins.

9. Describe in words and with your own diagrams, a suitable elementary course of free-hand drawing, either (*a*) for an infant school, or (*b*) for a school for older children.

10. Describe what appear to you to be the wisest and most effectual ways of dealing with disobedience or other misconduct (*a*) in an infant school, or (*b*) in a school for older children.

SECOND YEAR.

FIRST WEEK.

1. As in First Year.

2. As in First Year.

3. From the following particulars of a week's attendance in a class of 50 scholars, calculate (*a*) the number of attendances, (*b*) the average attendance, (*c*) the percentage of attendance. The attendance was regular with the following exceptions :—There was a holiday on one half-day; three scholars were absent the whole week; eight were absent four times; on one occasion two came in just after the register had been closed; and two were withdrawn before the completion of the minimum time constituting an attendance.

Describe the various marks to be used in the foregoing cases, and say how the absence mark may be cancelled in the case of scholars attending a class for special instruction under Art. 12 (*f*).

4. If you were the head teacher of a school, when and how would you test the progress of the several classes conducted by assistants or pupil-teachers? Describe the most efficient forms of test, and the manner in which you would make and preserve a record of the result.

5. Write the following in the Bass Clef (adding the key signature) to sound two octaves lower :—

The tones **d, r, t_i, d,** are the relative major for **l_i, t_i, se_i, l_i,** of the minor. What tones in the relative major correspond to the following :—

m d se_i l_i f m t_i d r m ba se l r m l?

6. Write the ascending scale of B minor, F♯ minor, and E♭ minor, using the major sixth and seventh.

Write the sharps or flats before the notes as necessary, and not as a signature; OR

Write the names of the following intervals :—

fe	s	la (flat)	fe	ma	d'
t_i'	d'	f	d'	re'	re

7. (*Men.*) As in First Year.

(*Women.*) Write a synopsis of Spenser's 'Early Life.'

8. Paraphrase :—

(*Men.*) Hamlet, lines 70 to 79, Act I., Scene i.

(*Women.*) Coriolanus, lines 67 to 80, Act I., Scene i.

9. (*Men.*) As in First Year.

(*Women.*) What are the principal cargoes, and whence, which arrive in Belfast, Dundee, Southampton, Gloucester, Liverpool, Glasgow, Newcastle, and Leith?

10. (*Men.*) As in First Year.

(*Women.*) Draw a map of England, showing the most important physical features.

11. (*Men.*) As in First Year.

(*Women.*) Give particulars respecting the chief inlets of Australia. Describe the Great Barrier Reef.

12. (*Men.*) As in First Year.

(*Women.*) Write out, giving dates, a table of the Tudor dynasty, tracing its descent from Edward III.

13. (*Men.*) As in First Year.

(*Women.*) What causes conduced to the absolutism of Henry VIII.?

14. (*Men.*) Find the principal which will amount at compound interest in two years to £739 7s. 6d., and in three years to £768 19s. Ans. £683 11s. 10½d.

(*Women.*) What is meant by discount? Find the discount on £1,666 due 9 months hence at 5½ p.c. Ans. £66.

15. As in First Year.

16. (*Men.*) Prove the rule for finding the number of permutations of n different things taken r at a time.

(*Women.*) Explain the meaning of the following terms :—*Insurance, cash prices, bonus, co-operative societies, provident societies, consols, railway stock.*

17. (*Men.*) How many different numbers can be formed by using the five figures 1, 2, 3, 4, 5? how many by using one or more of these figures? Ans. 120; 1,956.

(*Women.*) Cut out in paper the right half of a child's muslin pinafore.

18. (*Men.*) If from a cone of 4 feet radius and 10 feet in altitude the upper 4 feet are cut away, what is the solid content of the remaining frustum? Ans. 156.828 c. ft.

(*Women.*) Name several economical dinners for a man, his wife, and three young children, with the probable cost of each meal.

19. (*Men.*) Write out Euclid IV., 4.

If a circle touch the hypotenuse of a right-angled triangle externally and also its two sides produced, the diameter of the circle is equal to the perimeter of the triangle.

(*Women.*) Compare the value of beef, mutton, veal, poultry, and fish, under the heads of nutrition and economy.

20. (*Men only.*) Write out Euclid IV., 8.

The square described about a circle is double of the inscribed square.

CERTIFICATE ROUTINE FOR FEBRUARY 1894 (MEN AND WOMEN, FIRST YEAR).

DAYS	FIRST WEEK.			SECOND WEEK.			THIRD WEEK.			FOURTH WEEK.		
	I.	II.	III.	I.	II.	III.	I.	II.	III.	I.	II.	III.
MONDAY	General Principles of Teaching	Read Half of 'Coming of Arthur,' *or* 'The Princess'	Euclid, Book III., Props. 1 to 7, *or* Repairing Underclothing	Training of the Eyes	Language of Tennyson	Euclid, Book III., Props. 8 to 15, *or* Diagram of a Woman's Chemise	General Principles of Teaching	Analyse Lines 75 to 86 of 'Coming of Arthur,' *or* Lines 142 to 151 of 'The Princess,' 'Prologue.' Parse difficult words	Euclid, Book III., Props. 16 to 23, *or* Repairing of Underclothing	How to teach Writing	Analyse and Parse Lines 192 to 205 of 'Coming of Arthur,' *or* Lines 57 to 66 of 'The Princess.' Parse difficult words	Euclid, Book I., *or* Questions on Needlework
TUESDAY	Chief Dates from 1066 to 1215	Involution of Algebra, *or* Composition of Food	General Physical Geography of North America or India	Chief Dates from 1215 to 1376	Sequence of Intellectual Development	Shape, Size, and Motions of the Earth	Tables of the Norman and Angevin Dynasties	Ratio, Proportion, and Variation of Algebra, *or* Organs of Digestion	General Political Geography of North America or India	Chief Dates from 1376 to 1461	Geometrical Progression, *or* Cost of Clothing	The Atmosphere, Rain, Clouds, and Vapour
WEDNESDAY	The Cultivation of Intelligence	History from 1066 to 1215	How to Teach Reading	Discount, *or* Theory of Practice	Clock Problems, *or* Bills of Parcels	Measures and Multiples of Algebra, *or* Functions of Food	Notes of a Reading Lesson to Standard VII.	Problems of Motion, *or* Theory of Vulgar Fractions	Euclid, Book I., Props. 1 to 26, *or* Cutting-out of a Woman's Chemise	Mensuration of Parallelograms, *or* Decimal Fractions	Problems on A, B, and C, etc., *or* Theory of Decimals	Geography of Lower Canada *or* British Possessions in Asia
THURSDAY	History from 1600 to 1618, *or* Revision	Evolution of Algebra, *or* Nutritive Value of Food	Map of St. Lawrence, *or* Hindostan	History from 1215 to 1376	Algebraic Fractions and Surds, *or* Organs of Mastication	Winds, Currents, and Tides	Tables of the Yorkist, Lancastrian, and Tudor Dynasties	Arithmetical Progression, *or* Materials of Clothing	Map of Eastern British North America, *or* Palestine	History from 1376 to 1461	Harmonical Progression, *or* Cleansing of Clothing	Geography of Upper Canada, *or* Asiatic Russia
FRIDAY	Cube Root, *or* Practice	Deductions on Euclid, Book I., *or* Diagram of a Woman's Chemise	Analyse Lines 5 to 15 of 'Coming of Arthur,' *or* Lines 1 to 9 of 'The Princess,' 'The Prologue.' Parse difficult words	Constitutional Changes and Literature of the Period, *or* Revision	Deductions on Euclid, Book II., *or* Cutting-out of a Woman's Chemise	Style of Bacon, *or* Byron	Mensuration of Triangles, *or* Vulgar Fractions	Deductions on Euclid, Book III., Props. 1 to 15, *or* Any Needlework	Read 'Passing of Arthur,' *or* 'The Princess'	Problems on the Work of Mixed Agents, *or* Simple Interest	Cultivation of the Intelligence	Read 'Coming of Arthur,' *or* 'The Princess'
SATURDAY	Music, the Major Scale and its Structure	Science	Drawing	English Composition, 'The Life of Tennyson or Byron'	Music, Value of Notes and Rests	Science	Drawing	Repetition, Literature, and Penmanship	Music, Diatonic Intervals	Science	Drawing	Analyse Lines 134 to 146 of 'Coming of Arthur,' *or* Lines 30 to 39 of 'The Princess.' Parse difficult words	Musical Terms in Common Use	Science	Drawing	Repetition, Literature, and Penmanship

CERTIFICATE ROUTINE FOR FEBRUARY

CERTIFICATE ROUTINE FOR FEBRUARY 1894 (MEN AND WOMEN, SECOND YEAR).

DAYS	FIRST WEEK.			SECOND WEEK.			THIRD WEEK.			FOURTH WEEK.		
	I.	II.	III.	I.	II.	III.	I.	II.	III.	I.	II.	III.
MONDAY	School Organisation	Read 'Hamlet,' Act I., *or* 'Coriolanus,' Act I.	Revise Euclid, Book I. — Practise Tucking, and Marking in Cross-stitch	Formation of Habits and Character	Read 'Coming of Arthur,' *or* 'Spenser'	Revise Euclid, Book II. — Diagram of a Woman's Night-dress	The Health of Scholars and Teachers	Paraphrase Lines 79 to 95 of 'Hamlet,' Act I., Scene 1, *or* Lines 151 to 166 of 'Coriolanus,' Act I., Scene 1	Revise first 20 Props. of Euclid, Book III. — Practise Whipping and Feather Stitch	Pp. 1-22 of Spencer, *or* Educational Reformers, Chapt. 13	Analyse lines 115 to 126 of 'Hamlet,' Act I., Scene 3, *or* Lines 9 to 17 of 'Coriolanus,' Act I., Scene 2, Parse difficult words	Euclid, Book III. Props. 21 to 37 — Cutting out Boy's Shirt
TUESDAY	Chief Dates from 1066 to 1270 — History from 1485 to 1509	Cube Root — Discount	As in First Year — General Physical Geography of Britain	Read 'Hamlet,' *or* Grammar from Text-book	History as in First Year *or* from 1532 to 1547	As in First Year — General Physical Geography of Ireland	Chief Dates from 1270 to 1399 — Constitutional Changes from 1485 to 1602	Stocks	As in First Year — General Political Geography of Scotland	History from 1700 to 1714 — Military Operations from 1485 to 1547	Clock Sums	As in First Year — Climate Productions, and Commerce of Australia
WEDNESDAY	Analyse Lines 23 to 30 of 'Hamlet,' Act I., Scene 1, *or* Lines 67 to 76 of 'Coriolanus,' Act I., Scene 1, Parse difficult words	Problems leading to Quadratic Equations — Choice of Food	The Attendance Register, and How to keep it	Stocks	Soil, Aspect, and Drainage of School Premises	Any Revision	Notes of a Reading Lesson to Standard VII.	Combinations — Preparation of Food	Any Revision	The Principles of School Routine Making	Permutations and Combinations — Food for the Sick	Any Revision — General Political Geography of Ireland
THURSDAY	History from 1066 to 1215 — From 1509 to 1532	Problems involving Square Root — Discount	As in First Year — Physical Map of Great Britain	Permutations — Food for the Sick	History from 1215 to 1377 *or* from 1547 to 1553	As in First Year — General Political Geography of England	History from 1270 to 1399 — Most important Treaties from 1485 to 1602	Compound Interest	As in First Year — Map of Ireland	History from 1455 to 1509 — Naval Operations from 1485 to 1602	Sums like Equations — Square Root	As in First Year — General Political Geography of Scotland
FRIDAY	Problems in Simultaneous Quadratics — Duties of a Sick-Nurse	Deductions on Euclid, Book II. — Diagram of a Woman's Night-dress	The Processes of Reasoning	Permutations — Sources and Prevention of Waste in a Household	Deductions on Euclid, Book I. — Write down directions for making a Boy's Shirt	Any Revision	Permutations and Combinations — Household Expenses	Deductions on Euclid, Book III. — Darning in Stocking-web Stitch	'Hamlet,' *or* 'Spenser,'	Arithmetical Progression — Investment of Money	First 5 Props. of Euclid, Book IV. — Making of a Boy's Shirt	Paraphrase Lines 101 to 112 'Hamlet,' Act II., Scene 1, *or* Lines 41 to 53 Act I., Scene 9
SATURDAY	Music as in First Year / Science / Drawing / English Composition upon the character of 'Hamlet,' *or* 'Coriolanus'			Music as in First Year / Science / Drawing / Repetition, Literature and Penmanship			Music as in First Year / Science / Drawing / English Composition upon the character of 'Ophelia,' *or* 'Volumnia'			Music as in First Year / Science / Drawing / Repetition, Literature, and Penmanship		

(*Women.*) Explain the terms :—*Incisors*, *trachea*, *insalivation*, *asphyxia*, *capillaries*, and *automatic*.

SECOND WEEK.

1. Explain why a universal negative proposition admits of the conversion of its terms. 'All equilateral triangles are equiangular.' Say whether the terms of this proposition are convertible. If not, why not?

2. What is meant by Abstraction and by Generalization? Give examples of both these processes, and show how a knowledge of them would enable you to explain to pupil-teachers the true nature of an Abstract Noun and of a Common Noun respectively.

3. Explain the precise meaning of the words Simple Apprehension, Judgment, and Reasoning, as used in books on Logic. Give examples of each of these mental operations as they occur in ordinary school exercises.

4. Should the definition of a grammatical term be taught before or after the use and explanation of examples? Give reasons for your answer, and say how the two methods of procedure are logically distinguishable.

5. Give the notes of a lesson to a class of children on any one of these subjects :—
   (*a*) Fresh Air and its Uses.
   (*b*) The Skin and its Functions.
   (*c*) Cleanliness (*for infants*).

6. Say how you would treat these cases :—
   (i) That of a scholar very backward in Arithmetic, but equal to his fellows in other subjects.
   (ii) That of a scholar not capable of being taught with profit, even in Standard I.
   (iii) That of a habitual late-comer.

7. It has been said that the object of school education is not only to communicate knowledge, but to teach the learner to act and think for himself. Explain how, and by what sort of lessons, you can best give effect to this principle, either (*a*) in an infant school, or (*b*) in a school for older children.

8. Give an outline of a course of lessons on Elementary Science, adapted for the scholars of the Sixth Standard, and designed to explain the laws of health.

9. (*a*) In Mixed Schools, what are the special points which demand the Teacher's attention?
(*b*) In what way would you occupy the boys whilst the girls are engaged in Needlework?

10. How would you correct (*a*) Untruthfulness, (*b*) Copying, (*c*) Late-coming, (*d*) Inattention, (*e*) Taking off the attention of other children?

CORRESPONDENCE.

We shall be pleased to reply briefly through these columns to any SUBSCRIBER *seeking examinational information or advice, and* ENCLOSING THE NECESSARY COUPON.

This privilege does not, of course, extend to furnishing the solutions and answers of problems. All such communications should be addressed to 'THE QUERY EDITOR.'

Replies demanding urgency will be promptly forwarded per post on the receipt of a stamped and addressed envelope, ACCOMPANIED BY THE REQUISITE COUPON.

A post will be saved by writing direct to DR. GEORGE BEACH, M.A., (*Examination Editor of* '*Practical Teacher*'), STANLEY MOUNT, MACCLESFIELD.

W.N. (Dudley).—Can any one inform W.N. where 'The Relief of Lucknow' and 'Charge of Heavy Brigade' at Balaclava are procurable?

M.S.S. (Southampton).—No marks will be obtained for your Fourth Year Needlework.

R.U. (Eastham).—We cannot advise as to the soundness of financial investments.

B.R. (York), L.P. (Belston).—Apply to the Secretary, Educ. Dept., Whitehall, London, for a syllabus. No stamp is needed on your letter.

S.M. (Moseley).—She should try the Cambridge Local.

W.Z.J. (Peterbro').—Try Cambridge Day Training College.

MUSIC (———).—(1) You can take practical Tonic Sol-fa, and answer questions in Staff Notation. (2) We don't know, but it is not dear. Try at any scholastic stationer's.

ANSWERED PER ORDINARY LETTER.—W.H.T.P. (Southsea); J.C. (Arbroath); S.K. (Dewsbury); H.W.B. (Alnwick); T.H. (Stockport); J.F.N. (Birkenhead); W.T.A. (Gloucester); W.J.W. (Winchfield); W.A.W. (Harriseahead); O.G. (Canterbury); W.A.C. (Cowes); G.L. (Southport); S.W. (Whitwell); F.D. (Cheltenham); A.E.B. (Walton); T.B. (Langley); L.H. (Stoke-on-Trent); A.C. (Ellastone); E.S. (Ripley); J.E.S. (——); G.M. (Durham); D.J.L. (Llangyfelsche); 'PUBLISH' (London); J.C. (Amen Corner); J.I. (Pendleton); W.H.J. (Valley), two letters; E.W. (Sharrow); R.R. (West Bromwich); M.C. (Somerset East, Cape Colony); J.W. (Northwich); J.A.B. (Chelford); R.C.M. (Brighton); R.B.S. (Stockport); G.W. (Earlsdon); A.G.E. (Swanscombe); W.J.P. (Marazion); CANDIDATE (Gateshead); J.E.R. (Newcastle); A.T. (Belfast); W.T.B. (Conway); B.A.L. (Avondale); A.W.P. (Atherstone); G.M. (Bradley); A.M. (South Ockendon); S.P.T. (Exeter); E.M.O. (Kerry); H.P. (Kingston); W.V. (Bacup); R.N. (Portsmouth); T.S. (Birkenhead); E.J.T. (Burslem); M.P. (Forest Gate); E.E.U. (Wantage); B.C. (Manchester); E.O.S. (Yaxley); J.R. (Conway); H.M. (Waterhead); E.M. (Wardle); E.J. (Llandyssil); O.H.F. (Bunny); J.S. (Alloa); W.R. (Morpeth); A.F. (Buglawton).

NOTES ON PHYSIOLOGY:

EMBRACING THE SYLLABUS (ADVANCED AND HONOURS STAGES) OF THE SCIENCE AND ART DEPARTMENT.

BY WALKER OVEREND, M.B. (OXON.), B.SC. (LOND.).

The structure and function of the salivary glands. Changes during secretion.—The salivary glands in man are three pairs—parotid, submaxillary, and sublingual (see 'Elements of Physiology,' by the author). Each salivary gland is composed of many microscopic tubes, which open into each other and finally end in the larger tube, which carries the saliva into the mouth. At the opposite extremity, each microscopic tube is blind, and the blind termination is somewhat dilated, and constitutes the true secreting part, or *alveolus*. According to the nature of the cells lining each alveolus, the gland is called either (*a*) a *serous*, or (*b*) a *mucous* gland. The former secrete a limpid fluid containing a proteid resembling serum-albumin; the latter secrete a fluid free from proteid but containing more or less mucin, which makes the secretion somewhat slimy. In man, the whole of the parotid gland is a serous gland; the sublingual is a mucous gland, while portions of the submaxillary are mucous and portions are serous.

Serous glands.—If the cells of the alveoli are examined microscopically a long time after the last meal, say four hours (in other words, in the resting state) they are seen to be filled with dark granules, the cells are small and rounded, and the granules are so numerous that the nucleus is obscured. After the cells have been active, say one hour after a meal, they are much clearer, and contain *very few* granules.

Mucous glands.—In the mucous alveoli the cells are large, clear, and slightly granular. In addition, near the periphery of the alveolus, small half-moon shaped cells are to be seen, which stain well with such solutions as carmine and logwood. These are called *demi-lunes*, or *crescents*. When at rest, the mucous cells are large, and contain many granules. Immediately after activity, the granules are much less numerous. Evidently some granules have passed from the cells into the tube, to be discharged into the saliva, and there they become *mucin*.

The nervous supply of the salivary glands.—Each gland is supplied by branches from the sympathetic system of nerves, and also by a cranial nerve. The *chorda tympani*, a branch of the facial nerve supplies the submaxillary and sublingual glands, while the *auriculo-temporal* nerve, which comes from the 5th cranial nerve supplies the parotid gland. The fibres reach the auriculo-temporal nerve in a roundabout way. In reality they come from the glosso-pharyngeal nerve—through the *tympanic* nerve. When either of these nerves, the tympanic nerve of the glosso-pharyngeal or the chorda tympani of the facial, is stimulated by an electric current, a flow of saliva is induced. If we take the latter nerve, we find that two results are produced—(*a*) there is a copious secretion of saliva from the submaxillary gland, and (*b*) there is a dilatation of the blood-vessels of the gland. It might be supposed that the secretion is a result of the dilatation of the blood-vessels, in other words, that saliva is poured into the mouth because the blood-supply to the gland is increased. That this is not the case, is shown by the fact that if the arteries going to the gland are tied, and the nerve then stimulated, the secretion of saliva occurs just as it did before. Again, the converse occurs if atropin be injected previously. If

the chorda be now stimulated the blood-vessels dilate, but no secretion follows. Atropin has paralysed the secreting nerves of the gland. The two processes—secretion and dilatation of blood-vessels—are obviously independent, although, as a rule, both occur together and at the same time.

The *normal stimuli* for the secretion of saliva pass upwards to the brain, along the glosso-pharyngeal nerve or the gustatory branch of the 5th cranial (both these nerves supply the tongue), to a nerve centre or collection of ganglion cells in the medulla oblongata, and thence are reflected down the special nerves of the salivary glands, that is, the glossopharyngeal to the parotid, and the chorda tympani to the submaxillary and sublingual glands. If a drop of vinegar or tartaric acid be placed upon the tongue of a fasting dog, there is at once a copious flow of saliva into the mouth, but if the chorda be previously divided on both sides, this does not occur. Evidently the secretion of saliva is a *reflex act.*

Saliva, as obtained from the mouth, is a mixture of the secretions of the three pairs of glands. It is clear and viscid, and holds in suspension cells of the squamous epithelium detached from the sides of the mouth, and certain granular round cells, called salivary corpuscles, which probably are white blood corpuscles escaped from the vessels. Saliva has a faint alkaline reaction, and contains about ½ per cent. solid matter. The chief of the salts is sodium chloride. The organic bodies are : (1) albumin in small quantity ; (2) mucin, which is precipitated by dilute acids ; and, (3) a diastatic ferment, called ptyalin. Saliva, generally, also contains a minute quantity of potassium sulphocyanide, which becomes red when a solution of ferric chloride is added to it. About two pints, or more, are secreted during the day. This passes into the stomach, and is again re-absorbed from it into the body.

Functions of Saliva.—(1) Saliva moistens the food and aids in deglutition ; (2) the ferment it contains converts starch into maltose and dextrin. If a solution of starch be warmed (about 35° C. is best, that is, the temperature of the body), and saliva be added, the starch (which strikes blue with a solution of iodine) is first changed into a body termed *dextrin* (which strikes red with iodine), and then finally into *maltose*, which is not coloured at all by iodine ; but when potash is added, and a drop of a solution of copper sulphate, and the mixture boiled, the copper is reduced, and a red precipitate of suboxide of copper (cuprous oxide, Cu_2O) falls. The action of ptyalin depends on the temperature. It proceeds best and quickest at 30°–45° C. Its activity, moreover, is greatest in a liquid which is slightly alkaline. Strong acidity prevents its action altogether. In the stomach this ferment action of ptyalin proceeds uninterruptedly for about half an hour. At the end of that time the amount of free HCl in the gastric juice becomes sufficient to stop it. Above 60° C. the action stops also, and the ferment becomes destroyed.

The Stomach.—The opening of the œsophagus into the stomach is guarded by a thickening of the circular fibres of the œsophagus, which is called the *cardiac sphincter*. The proper circular fibres of the muscular coat of the stomach are also well developed at its pyloric end, and constitute the *pyloric* sphincter. The longitudinal fibres are continuous with the longitudinal muscular fibres of the œsophagus. The *mucous membrane* of the stomach presents prominent folds (*ruga*) and scattered all over are innumerable depressions, easily observed by the use of a magnifying lens. These depressions are the orifices of the gastric glands—which are simple tubes, occupying nearly the whole thickness of the mucous membrane. The whole of the mucous membrane is covered by a layer of cylindrical cells, lying upon a basement membrane. The glands are divisible, according to their position, into cardiac and pyloric glands. The cardiac glands of the stomach are filled with two kinds of cells—some which stain deeply with a solution of aniline blue, are nucleated, and being nearer the outside are termed *parietal* cells. The remainder of the tube is filled with smaller, granular cells called *central* cells. The *pyloric* glands are tubular also, but may be bifid at their deeper ends. The cells are short, small, and cubical, and resemble the *central* cells of the *cardiac* glands. Gastric juice is a thin acid fluid containing about 1. per cent. solids, of which about 0·4 consists of *pepsin*, 0·2 free hydrochloric acid, the rest consisting of sodium, potassium, and calcium chloride with calcium phosphate, &c. It is now practically settled that the larger parietal cells secrete the *acid*, while the central cells of the cardiac glands, and the cells of the pyloric glands, secrete the pepsin, and a substance termed the *rennet* ferment, for if the pyloric part of a dog's stomach be isolated from the rest by ligatures, its secretion contains pepsin and rennet ferment, but *no* acid. When the glands have been active, the granules of the central cells and those of the pyloric glands, are found to be much less numerous.

When we strip off the gastric mucous membrane of a recently killed animal, as a rabbit, and place it in glycerine for a few days, the latter extracts the ferment, so that if we add to the glycerine a quantity of HCl, of 0·2 per cent. strength, we obtain an artificial gastric juice. If we take three beakers, A, B, C, and into A pour a quantity of 0·2 per cent. HCl, and add some *fibrin*, into B, fibrin with pepsin, into C, fibrin, some 0·2 per cent. HCl, and pepsin, and keep the three beakers at a constant temperature (35°C) for some time, there is little action on the fibrin in A and B, but in C the fibrin is completely dissolved, so that the two, the acid and the pepsin, are necessary to each other. Pepsin is a ferment, like ptyalin, but its action is confined to proteids, such as albumin, myosin, and fibrin. These proteids are converted into a soluble proteid called *peptone*. Peptones possess several properties by which they may be distinguished from other proteids :—

(*a*) Their solutions are not coagulated on boiling, nor by the addition of acids.

(*b*) They are not precipitated by a saturated solution of ammonium sulphate.

(*c*) Peptones pass through animal membranes, as parchment paper, with a certain degree of facility, not nearly so rapidly as sugar or salt do, but certainly much more quickly than other proteids.

(*d*) With a dilute solution of copper sulphate, they give a rose-colour, called the peptone-rose reaction.

The essential attribute of the gastric juice is the power of breaking down and dissolving a large part of the solid proteid foods, and ultimately converting them into peptones. This power depends, as already stated, on the co-existence in the juice of a ferment termed pepsin, and an acid, namely free HCl. Besides these, gastric juice contains a rennet-ferment which curdles milk. In whatever way peptones are produced, certain intermediate products arise, called *albumoses ;* but the albumoses are precipitated by nitric acid in the cold, and the precipitate dissolves on warming. Also albumoses are precipitated by a saturated solution of ammonium sulphate.

The quantity of peptone found in the stomach of a dog after one hour, or two hours' interval after a meal, is remarkably constant. It is therefore inferred that peptone never accumulates in the stomach, but is gradually absorbed from the stomach as it is formed.

CONVERSATIONAL LESSONS IN CHEMISTRY.

BY THOMAS CARTWRIGHT, B.A., B.SC.(LOND.).

First Class Honoursman in Chemistry, S. and A. Department Lecturer in Chemistry to the Middlesex County Council, and in Physiography to the Birkbeck Institution, Chancery Lane, E.C.

For particulars of the List of Chemicals and PRACTICAL TEACHER Set of Apparatus for working the experiments referred to in these lessons see numbers for January and February 1893.

LESSON XII.—CHLORINE.

To-day our class-room shall be the playground, as we are about to study a body dangerous to breathe : in the open air the fumes will be carried away, and the danger avoided. The body in question is a gaseous element. As there are only four elementary gases, and we have already studied three of them, it will not be difficult for you to name the gas under study. Quite right, Tom, it is chlorine, the symbol for which is Cl. But to the playground, where you will find the necessary apparatus with which you are already so familiar, it being a flask fitted with a thistle-funnel and a leading tube similar to that which we fitted up in our first lesson. What is this black stuff, Frank ? It is manganese dioxide, sir ; we used it to bring off the oxygen from chlorate of potash more easily. Well remembered. See, we place some of the dioxide in the flask, and then cork. Now pour some hydrochloric acid down the thistle-funnel and apply heat. Observe the gas jar. How are we going to collect the gas, Trixie ? I can see, sir, that the gas will go down and drive the air up, therefore it must be heavier than air. How did we collect our O and H ? Over water. Why not do the same with this gas, Annie ? I suppose it is because the water would dissolve it, and we should have our pains for nothing. Very good, and you see we have already learnt (1) that Cl is heavier than air, (2) that it is soluble in water, and (3) what, Charlie ? Look at the jar before replying. Well, Arthur ? That the gas is

green in colour, sir. Exactly so, and that is the meaning of the term chlorine, which comes from a Greek word, chloro (green). Here, Ernie, is some powdered antimony, what does the fact of its being powdered suggest? Well, you try, Laura. That it is a brittle metal. To you, Lionel, I give this thin leaf of Dutch metal consisting mainly of copper, so you may speak of it as copper. You, Minnie, soak this blotting paper in turpentine, which I must tell you is a compound of carbon and hydrogen ($C_{10}H_{16}$). Your work, Willie, is to write your name over this slip of newspaper; whilst to you, Isabel, we apportion this piece of red cloth.

Drop your antimony, Ernie, into this jar of Cl: what happens? The jar is full of sparks, and dense fumes escape from the mouth. What caused the heat which is the reason for the sparks? Think well. I know this, it was the heat of chemical combination, and the antimony must have combined with the Cl, and the fumes are the new body formed. Very true, and what is the name of this body? Antimony chloride, sir, as is made by the combination of antimony and chlorine. Lionel will do the same with his Dutch metal, and you see the result is the same. What is the new body? Copper chloride. True, and we might repeat this experiment with other metals. What do we learn by these two experiments? Go on, Tom. That chlorine readily unites with metals. Good, and now, Minnie, drop your blotting paper into your jar of the gas, and describe the result. The bodies unite, as is shown by the flame, but I cannot explain the black stuff which settles on the sides of the jar. Of what did your turpentine consist? Of C and H. Well, the fumes are due to hydrochloric acid, as you can prove by holding this drop, which has been dipped in ammonia, in them. See those dense white fumes: they are due to the combination of hydrochloric acid with the ammonia, and the hydrochloric acid was formed by the union of Cl and the H of the turpentine. Now tell me what is the black stuff. It must be carbon, sir. That is just what it is, and I shall be glad if you will well remember that Cl has great affinity for H, whilst for carbon it has no affinity, hence the deposition of the carbon, or soot, on the sides of the jar. Now, Willie, we are waiting for you. In with your newspaper, and whilst watching this experiment all of you please call to mind what we have already done. Now produce your name, my boy. I can't find it, sir. No, for the chlorine has removed the colour from your ink, *i.e.* it has bleached it, and another important fact to remember is that chlorine is a bleacher; but what has it not bleached, Willie? It has not bleached the printing. No, it will not do so, for printer's ink is different from writing ink, the former being composed of mineral substances, the latter of vegetable substances, and this experiment shows that chlorine bleaches vegetable colours, but has no effect upon mineral colours.

The next bit of work will prove the same fact, and something else besides. Let fall your red cloth, Isabel. Notice that it does not bleach, and for this reason, both it and the chlorine are dry, and *dry chlorine will not bleach*. Moisten the red cloth and let the chlorine now have access to it, and at once the bleaching commences. How do country people whiten their clothes, Trixie? By putting them on hedges, and by laying them on the ground. Very true, but what do you think is the bleaching agent? is it the hedge or the grass? Well, Bob, you are generally good at puzzles, what about this one? I should think it was the air that bleached them, sir. In that you are correct, but what part of the air? The oxygen, sir, without doubt. Yes, and when chlorine bleaches it is still the oxygen that does the work. Now, who can explain that paradox? Nobody. Very well, now let us simplify somewhat. What must be present in addition to the Cl? Water, sir. And of what does water consist, Annie? Of O and H, sir. Again true; and what is the action of Cl on H? It combines with it readily, and I can answer your question now, sir. Go on, Bob. The Cl in combining with the H sets free the O, and the freed O does that bleaching just as it does when clothes are placed in the field. I'm glad you have found that out for yourself. This question of bleaching is a most important one for the cotton spinner, as it enables him to turn his dirty-looking brown calico into the white dainty cloth which you see at the draper's. Into this we shall enter more fully in our next lesson. Now I want you to think what is the most important Cl compound found in nature. I know, sir; it is common salt, which is sodium chloride. Yes, and as chlorine is so very important to the manufacturer it is important to get it cheap. Can it be got from common salt? It can, and I will proceed to explain how. Into the flask already provided place some salt and some manganese dioxide, and replace the cork. Down the funnel pour some sulphuric acid, and heat. Cl as before is given off, and it is no wonder, for the H_2SO_4 with the salt forms hydrochloric acid, which is acted upon by the manganese dioxide as above described, so that the two operations are in reality only one. In bringing this lesson to a close I am sure you would like to know that our countryman, the great Sir Humphrey Davy, was the first chemist to prove that chlorine was an element and not a compound.

REVIEWS.

Vergil: Aeneid, Book V. Edited by A. H. Allcroft and W. F. Masom. Part I.; Introduction, Text, and Notes. 'Univ. Corr. Coll. Tutorial Series.'

If there is any fault to find with this edition, it is that the notes are too numerous and too minute, giving no encouragement to the student to use his own wits. This, however, is an outcome of the Examination System as a whole; and, granting this, there is nothing but praise to award. Not a single point seems to have been missed, and all explanations are given with an admirable conciseness. The plan is that of previous works in this series, and is probably the one suggested by the long experience of the University Correspondence College as being the best possible.

To combat definitions is dangerous, but we would suggest that the one given of 'Epic,' on p. 12 of this volume, omits to mention the *grand style* in which such poems are generally written.

We may add that this book is included among the special subjects for the London Matriculation Examination of January 1895.

Torch-Bearers of History; a connected series of Historical Sketches. By Amelia Hutchison Stirling. London: T. Nelson and Sons.

This is a very praiseworthy attempt to give young readers some idea of the continuity and, indeed, the unity of History. The title of the book is taken from that figure which represents persons in successive ages as handing on the torch of knowledge or progress. In a series of chapters, written in an interesting and spirited style, the author contrives to develop this idea very skilfully. The first part covers the period from Prehistoric Times to the Fall of the Western Empire, and the second carries on the narrative to the Reformation. The plan adopted is to take some historical personage as a typical and central character in regard to some great event or movement. Thus we have Homer representative of the Mythical Period, Sophocles of the Golden Age of Greece. These are followed by Socrates, Alexander the Great, Regulus, Julius Cæsar, Virgil, and Hypatia. In the more modern period we have King Arthur, Charlemagne, Rollo, The Cid, Richard Cœur de Lion, Dante, Robert Bruce, Joan of Arc, Columbus, Copernicus, and Luther. Each of these is treated in a fashion which is likely to attract and to impress the young mind. It is admittedly a difficult, practically an impossible, task to observe due proportion in dealing with so extensive a series of persons and events, but the main idea is kept well in view by the author, who shows excellent judgment in the selection of details, in the warnings as to legend and fact, and especially in the references to the correlation and comparison of events and characters. The book is produced in capital style, and would serve admirably for an upper class reader, or for a prize volume.

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Pictorial Illustrations of Physical Phenomena: The Rainbow. Edinburgh and London: W. and A. K. Johnston.

This is a bright and attractive wall-sheet, satisfactory both in appearance and general 'get-up.' There are, however, one or two small points in which the sheet may perhaps be susceptible of improvement, and we draw attention to them, as they may possibly be thought important enough for consideration in future editions. The letter-press description of the rainbow at the foot might well be amplified; and the insertion of a small diagram illustrative of the formation of the bow by the reflection of the sun's rays by the rain-drops would be a useful addition. In the sentence, 'A rainbow is formed on rain-drops opposite the sun.' the words 'opposite the sun' do not convey very much meaning to the reader unless he happens to understand already all about the formation of the rainbow. A rainbow is always formed when the sun's rays fall upon rain-drops, although it may not always be possible for a human being to get in a position to observe it. It would, for instance, be perfectly possible for an aeronaut in a balloon floating above a rain-cloud, and with the sun above him in his zenith, to see a rainbow beneath him in the shape of a complete circle. The other queries that might be raised are on minor points in the drawing itself. The swallow represented as skimming over the stream in the middle foreground is, judging from the cows hard by, about four feet across the wings—a very Anak amongst swallows. The rainbow itself is shown as being brightest and most perfect in the clear sky, and indistinct and broken in the actual rain-cloud. Surely this is contrary to general observation.

Pictorial Illustrations of Physical Phenomena: A Glacier. Edinburgh and London: W. and A. K. Johnston.

The descriptive letter-press appended to this plate wants revision, for in several places the wording is careless and the statements inaccurate. Referring to the motion of glaciers, it says that, 'Many observations have been made since then (1827), with the result that, on an average, glaciers move at the rate of 37 inches per day.' It will be new to most people that the movement of glaciers is caused by observations. Another sentence is, 'This is called the *Moraine*, on account of friction;' here, by an error in punctuation, we are presented with a bit of etymological information which is as novel as it is surprising. The statements contained in the sentences, 'Glaciers generally terminate as the source of a river, disappear underground, or where they terminate at the coast, fall into the sea as icebergs,' seem somewhat unfortunately expressed. With reference to the first statement, for instance, it need hardly be pointed out that the stream which issues from the end of a glacier does not commence there, but has been flowing perhaps for miles under the glacier itself. It is, in fact, easy to realize that under the glacier there is quite a system of sub-glacial rivulets, the combined flow from which issues in considerable volume from the lower end of the glacier.

Pictorial Illustrations of Physical Phenomena: A Volcano. Edinburgh and London: W. and A. K. Johnston.

This is a very effective, and, indeed, powerful illustration of Vesuvius in eruption. It pourtrays in quite a realistic manner the terrible bursts of vapour and clouds of smoke and semi-incandescent material which form the characteristic features of such a phenomenon. The whole mountain is dwarfed by the huge cumuli of many-coloured clouds which rise in eddying masses for miles high above it.

Scott: Lord of the Isles. Edited, with Introduction and Notes, by Thomas Bayne. Oxford: At the Clarendon Press.

This edition of Scott's metrical romance, which includes his spirited description of the Battle of Bannockburn, is worthy of the scholarly series issued from the Clarendon Press. The Introduction is interesting and discriminating; and the copious notes form quite a treasury of antiquarian, historical, and topographical lore. The longer passages of commentary are naturally drawn from Sir Walter's own annotations, but the editor has bestowed great care on the explanation of archaic and other difficult words and expressions. For the most part the verbal and linguistic notes are thoroughly suitable for the purpose of the student of English literature; but here and there one would say there is a redundancy, as, for instance, when three or four lines are devoted to the word *glean*, including a reference to the Book of Ruth, and when *meed* and a few other words are explained more than once. The volume is strongly and neatly bound, and in every way does credit to the publishers.

Navigation. Book I. By John Don, M.A. London and Edinburgh: W. and R. Chambers, Limited.

This is a little book intended for the use of pupils taking Navigation as a specific subject under Schedule IV. of the Education Code. The elements of the subject are treated in a very simple manner. A detailed description is given of the mariner's compass, the use of which is very clearly explained. The methods of Plane Sailing and Traverse Sailing are also described, and many exercises are given in the determination of a vessel's course. We note an error in the rule for obtaining the magnetic course from the true course, the word *magnetic* being printed for *true* (page 45). A special feature is the introduction of the Gaelic for the 'Boxing of the Compass' with a view to adapting the book for use in schools on the Highland seaboard.

A History of English Literature for Junior Classes. By Frederick A. Laing. London and Glasgow: William Collins, Sons, and Company, Limited.

This is a new and enlarged edition of a book which has been some years before the public. The additions consist chiefly of sections dealing with the more recent writers, and a series of well executed portraits taken from photographs. The style is clear and well adapted for young readers; the biographical sketches are on the whole carefully done, and the specimen passages judiciously chosen. A few errors have escaped correction; one of Tennyson's poems is named *Demitis* instead of *Demeter*, Browning's last book is wrongly called *Assolando*, and Thackeray's school is given as Charter House School, a further misleading and needless corruption of the name Charterhouse, from Chartreuse, or Carthusian.

The Tutorial History of Rome to 14 A.D. By A. H. Allcroft, M.A. (Oxon.), and W. F. Masom, M.A. (Lond.). London: W. B. Clive and Co., University Correspondence College Press.

Experts in the art of preparing students for University Examinations, the authors of this work are eminently qualified to produce a compact and serviceable text-book. In this volume they present the history of Rome in an ably written narrative extending from the earliest times to the death of Augustus. In the earlier part they have to deal with the legendary stories which only serve to cast a dim and uncertain light over the obscurity and gloom that shroud the beginnings of events. In this part of their task they exhibit skill and good judgment in sifting the true or the probable from the doubtful or the fabulous. Throughout the work the endeavour is made to classify the facts under the headings of external and internal history, the one recording the outward growth of the Roman power, the other tracing the development of the state in regard to constitution, laws, and customs. At the same time, the interdependence of these two kinds of change is kept in view. This plan of the work gives to the subject a special interest, which may greatly assist the student in understanding and remembering the facts both as to their details and their relations. The history is given in sufficient fulness for the needs of any ordinary student, and the highest authorities have been consulted in the selection of matter. Several maps and plans are inserted. The volume is well printed and substantially bound.

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Introduction to Shakespeare. By Edward Dowden, Litt. D., LL.D. London: Blackie and Son, Limited.

The publishers of the 'Henry Irving Shakespeare' have done well to issue in a separate handy volume the admirable Introduction written for that work by Professor Dowden. The essay, which has been carefully revised and somewhat extended, is, as might be expected from so profound and sympathetic a student of Shakespeare's works as the learned author of 'The Mind and Art of Shakespeare,' both scholarly and critical. It is also well arranged and thoroughly interesting. In the first part the author gives us a carefully written narrative of the external life of the great dramatist, our knowledge of which he does not admit to be so meagre as some writers are fond of describing it. Next he traces for us with wonderful critical insight that inner life of the poet which may be derived from study of his works; and lastly, he unfolds the story of "the growth of Shakespeare's fame and his mighty influence on humanity, which may be regarded as his life of posthumous influence. The whole book is extremely suggestive, and may be profitably read by every student of Shakespeare. Messrs. Blackie have issued it in a neat form, and with the advantages of good paper and clear type.

Algebra for Beginners. By H. S. Hall, M.A., and S. R. Knight, B.A., M.B., Ch.B. London: Macmillan and Co.

The 'Elementary Algebra' of Messrs. Hall and Knight, and their 'Higher Algebra' are widely known and highly appreciated. The present work, by the same authors, is issued as an introduction to the Elementary Algebra. The same general lines and methods are followed, but the explanations are made somewhat simpler so as to meet the requirements of younger students. The exercises are very numerous, most carefully graduated, and full of the interest of variety. The important subject of resolution into factors is fully dealt with, and the work includes quadratic equations and problems producing them. We feel sure that where it is adopted it will be found admirably adapted to its purpose, and worthy of similar appreciation to that accorded to the earlier works of the same authors.

Wall Maps: (1) The World, on Mercator's Projection; (2) Ireland. Edinburgh and London: W. and A. K. Johnston.

Both these maps are commendable productions, being clearly printed, nicely coloured, and serviceably got up. As in other publications of a similar nature by the same well-known house, the coast outlines and river courses are printed in dark blue, the mountains in brown, and the names of towns and other features in black. From this happy combination of colouring there is considerable gain in clearness and general artistic effect. In the map of Ireland the indication of the length of a degree of longitude at each parallel of latitude is a useful addition, as it affords a simple means of calculating distances, and is calculated to prevent learners from forming wrong impressions as to the size of the country represented. In the map of the world clock-dials are inserted here and there to indicate the local time at particular places. Oddly enough, although all these local times are calculated on the assumption that it is twelve o'clock (noon) at Greenwich, there is no clock-dial or other indication of this fact given on the Greenwich meridian itself; and much of the utility, too, of the dial-faces is unfortunately lost owing to the two hands of the clock being drawn so very nearly the same size as to make it rather difficult for young people to determine what time of day is really intended to be indicated.

Blackie's English Classics: Scott's Lay of the Last Minstrel. Cantos I. to VI.: with Introduction and Notes. London: Blackie and Son, Limited.

This is a very handy edition of the famous poem which began Sir Walter Scott's series of metrical romances. For the greater convenience of students the publishers issue it in three forms; the six cantos may be had separately; cantos I. to III. and IV. to VI. are made into two sections; and the whole is bound up in a neat volume.

The introduction consists of four parts; the first historical, the next on the form of the poem, the third critical, and the last a summary of the story. It is very properly suggested that the reading of the critical part should be deferred till the text itself and the notes have been read. The notes are carefully compiled so as to help young students to a sound appreciation of the poem. Many of Scott's own copious annotations have been embodied.

We feel justified in recommending this edition as thoroughly well adapted for its purpose.

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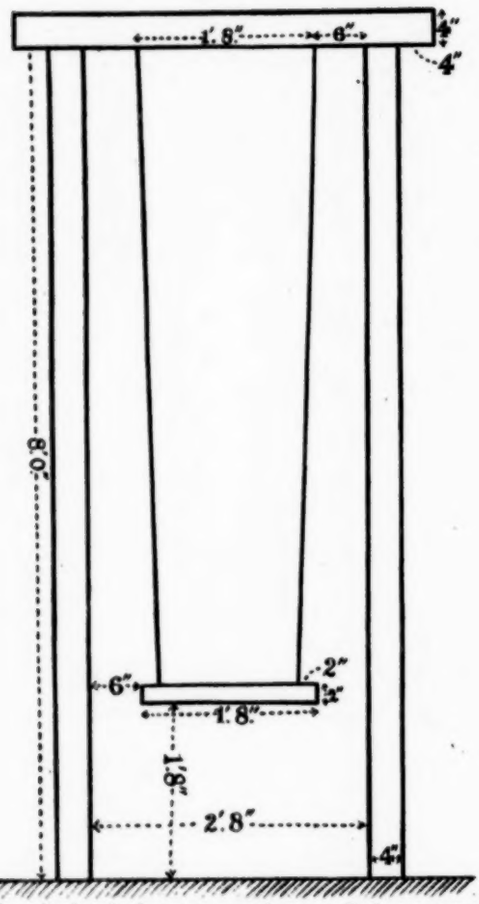

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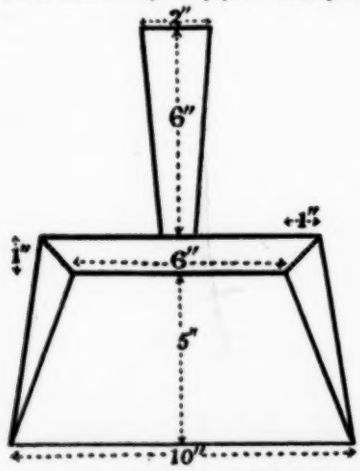

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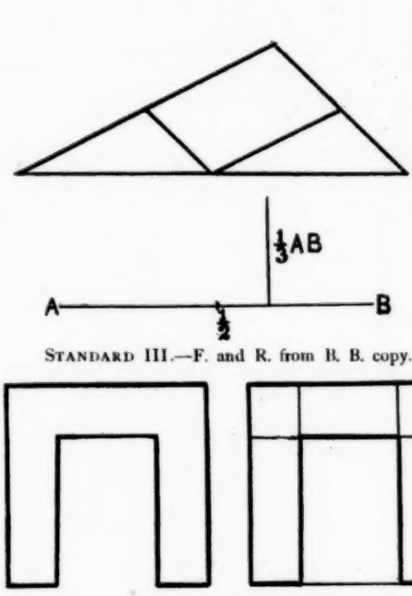

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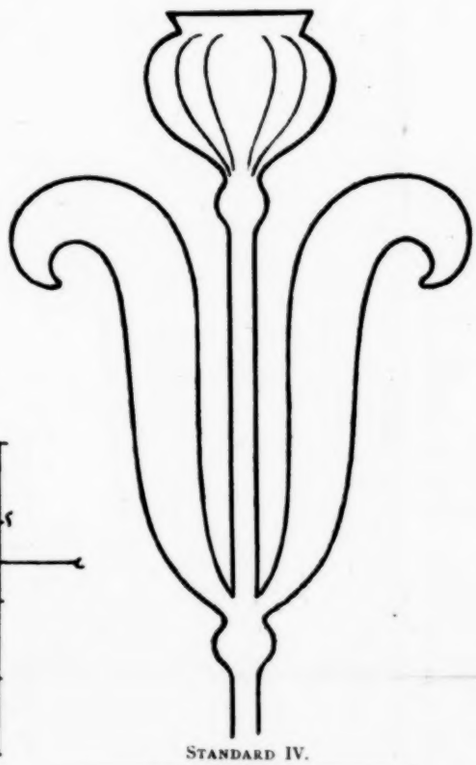

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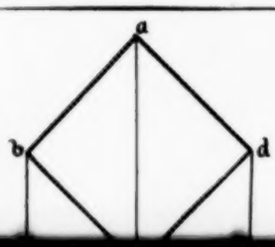

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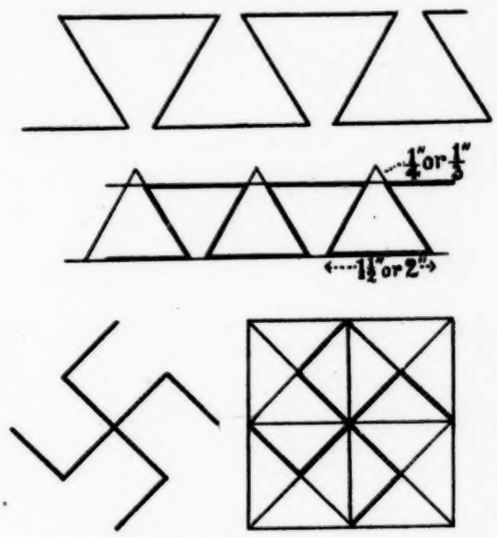
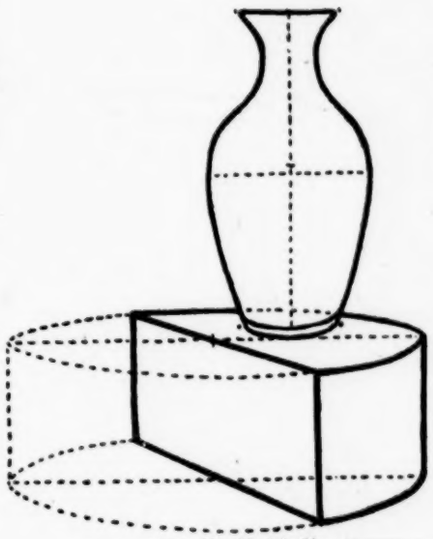
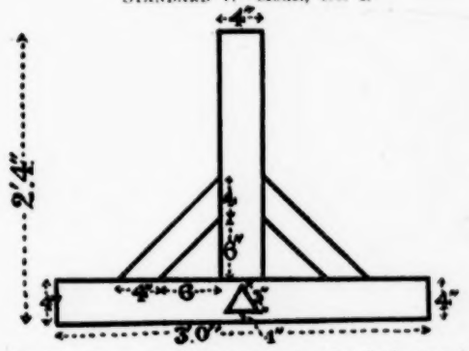


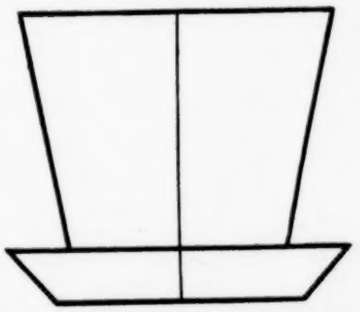
STANDARD III.—Ruler, from cards.



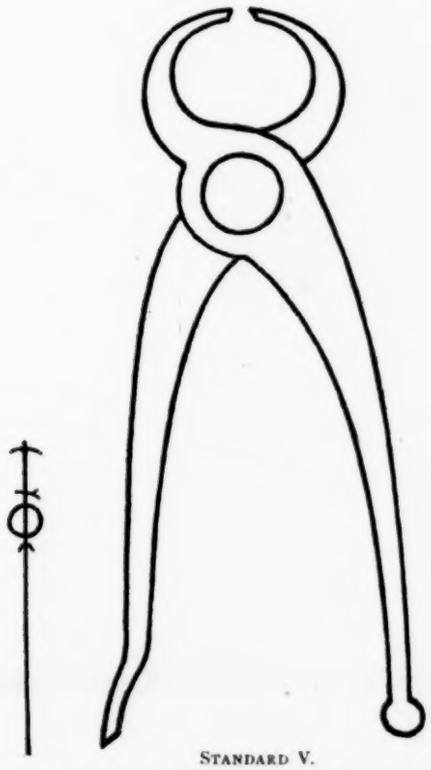
STANDARD V.—Model, No. 2.



ST. IV.—Draw on plain paper to a scale of 1 in. to 1 ft.



ST. IV.—Draw the above figure twice *the size*.



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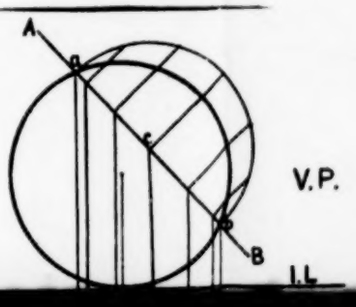
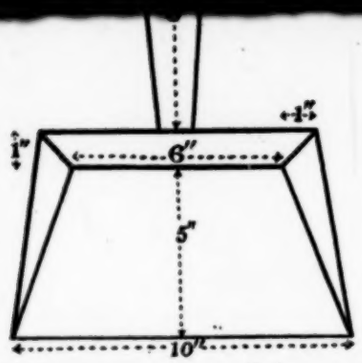
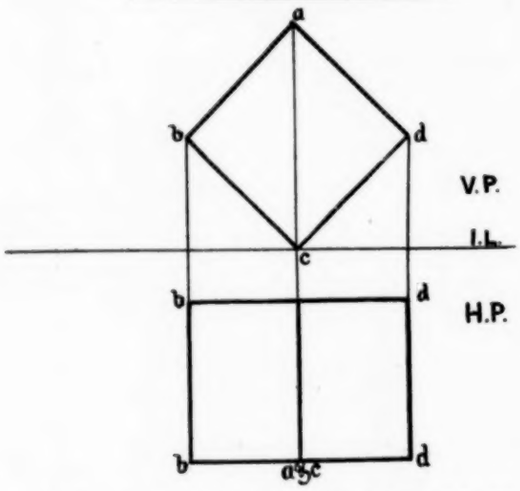


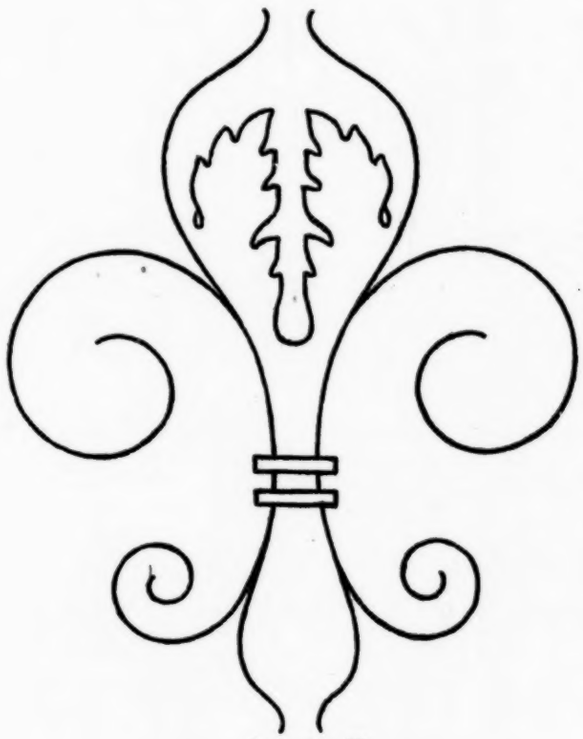


St. IV.—To be drawn on squared paper. Each square represents ½ inch.

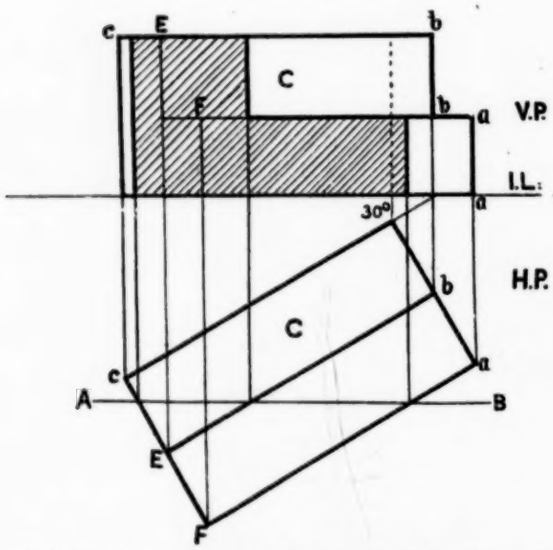
STANDARD IV.



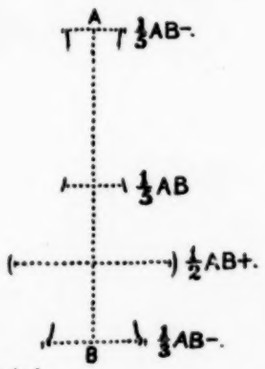
St. VI.—The elevation of a cube is given. Copy this elevation and draw the plan.



STANDARD VI.



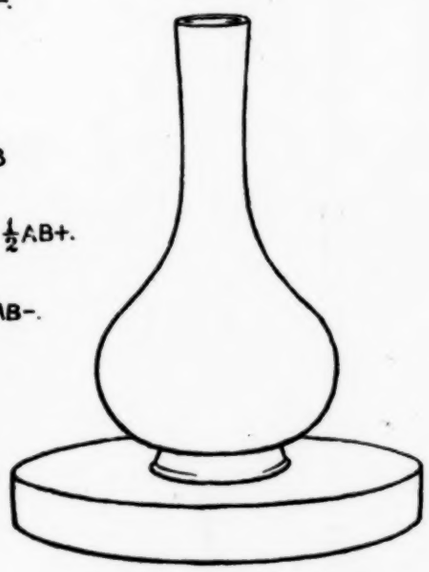
St. VI.—The plan of two steps is given, C being the upper one. The height of each step is equal to width E F. Draw elevation, and elevation made by section A B.



St. VII. 1. Copy the given circle, and draw another of half an inch radius, touching it at the point A.

2. Draw a scale of ¼ in. to 1 ft. to show 7 ft., and mark on it a length of 3 ft. 5in.

3. On a line 3 ft. long draw a triangle similar to the given triangle. (*Scale ¾ in. to 1 ft.*)



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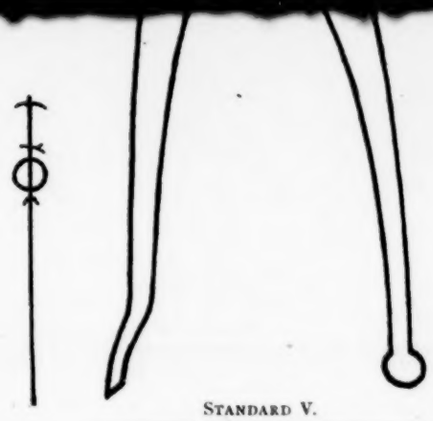
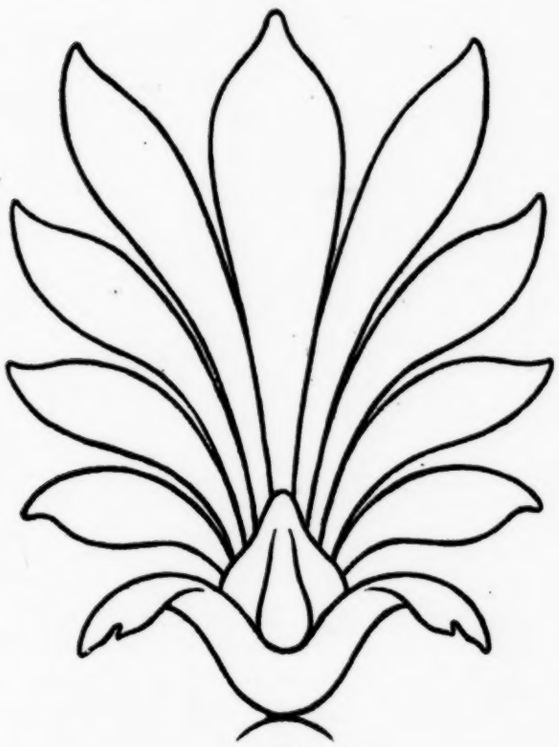
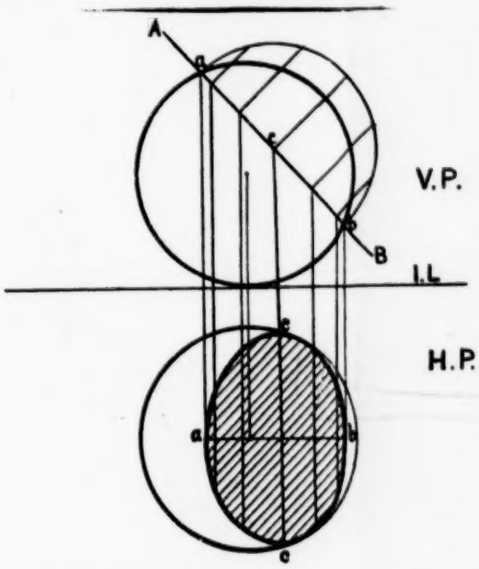


STANDARD V.

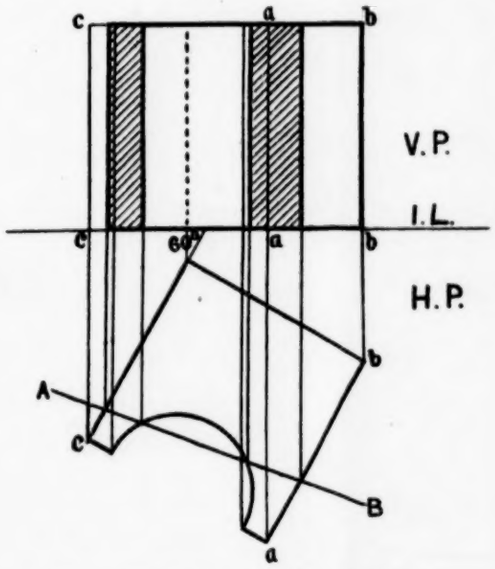
ST. IV.—Draw the above figure twice the size.



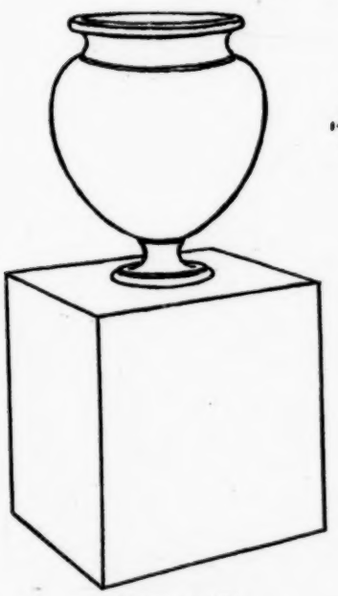
STANDARD VII.



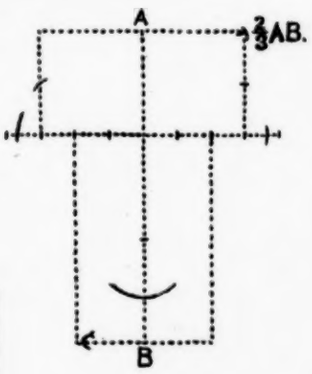
ST. VII.—The elevation of a sphere is given, cut by a section A B. Draw plan of sphere and of section.



ST. VII.—The given figure is the plan of a cube with a semicircular groove on one side. Draw the elevation, and elevation of section made by vertical plane A B.



STANDARD VI.



ST. V.—1. Copy the given triangle, and bisect one side and one angle.

2. Draw two right lines 2 ft. long, and make them meet at an angle of 90°. (*Scale* ½ *in. to* 1 *ft.*)

3. Draw A B, and raise a perpendicular on it at the point B.

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